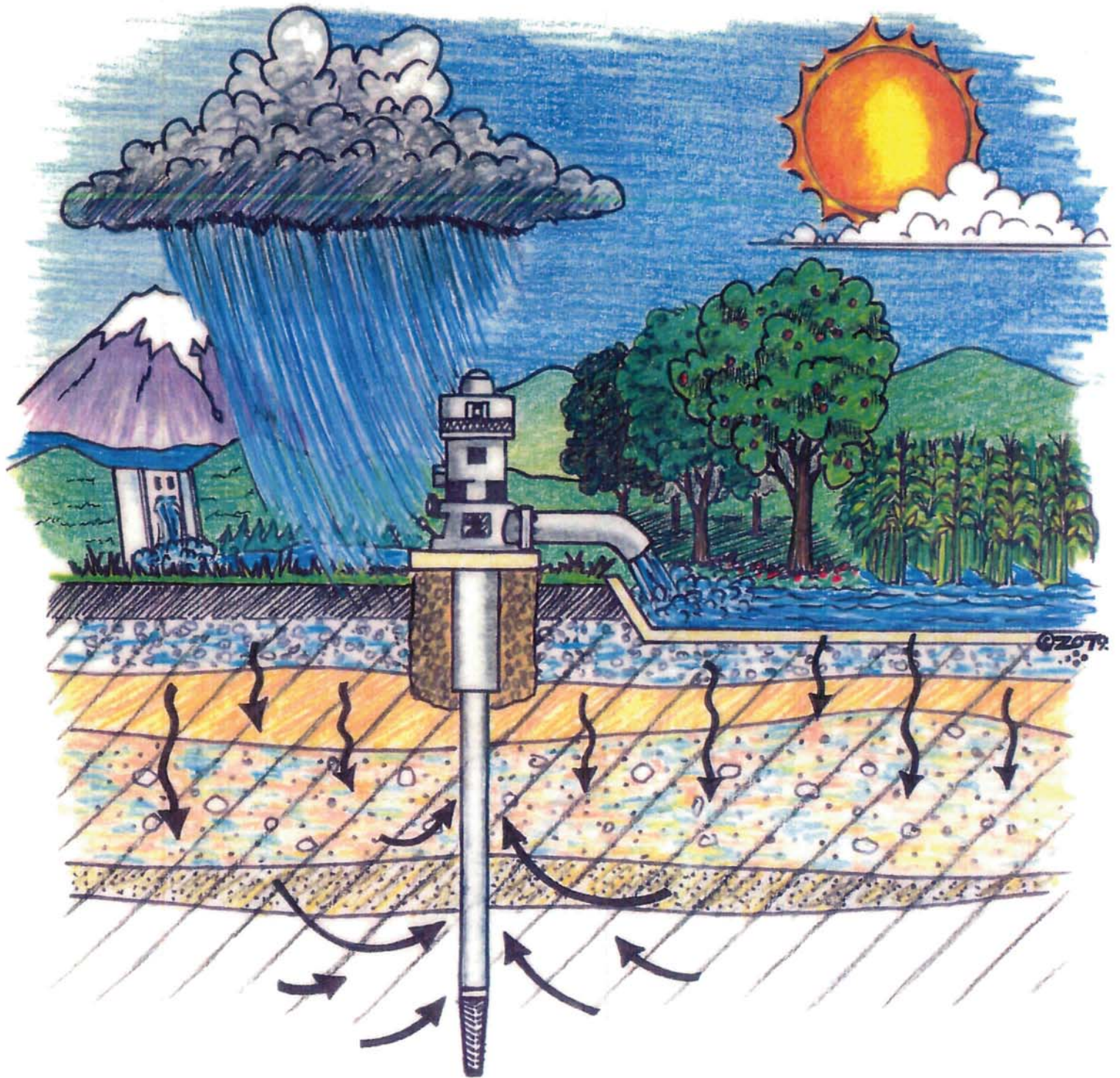


# G. C. I. D.

GLENN - COLUSA IRRIGATION DISTRICT



GROUNDWATER MANAGEMENT PLAN

AB3030

# GLENN-COLUSA IRRIGATION DISTRICT GROUNDWATER MANAGEMENT PLAN

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## **GLENN-COLUSA IRRIGATION DISTRICT GROUNDWATER MANAGEMENT PLAN**

### **I. INTRODUCTION**

On January 1, 1993, the Groundwater Management Act (AB 3030) became law. The Groundwater Management Act, as codified at California Water Code sections 10750 *et seq.*, encourages local water service agencies to adopt groundwater management plans and programs to insure the efficient use, safe production, and quality of groundwater resources within the local agency's jurisdiction.

A "groundwater management plan" is defined by the California Department of Water Resources Bulletin 118-80 as "planned use of the groundwater basin yield, storage space, transmission capability, and water in storage." Water Code section 10752(e) defines "groundwater management program" as a coordinated and ongoing activity undertaken for the benefit of a groundwater basin pursuant to a groundwater management plan adopted as specified in AB 3030.

On June 3, 1993, Glenn-Colusa Irrigation District's Board of Directors, following a public hearing, adopted its Resolution of Intention to Adopt a Groundwater Management Plan pursuant to Water Code section 10753 *et seq.* (See Appendix A). Based upon the foregoing, Glenn-Colusa Irrigation District ("GCID") undertakes this groundwater management plan to manage the groundwater resources within its jurisdiction.



## II. GOALS

The goal of GCID's groundwater management plan is to implement sound management of the groundwater resources within GCID's service area, consistent with the planned use of groundwater basin yield, storage space, transmission capability, and water storage. GCID's groundwater management plan shall reflect sound principles of groundwater optimization which include, but are not limited to, the following:

- (1) Protection of natural recharge and use of intentional recharge;
- (2) Protection and planned maintenance of groundwater quality;
- (3) Conjunctive use of groundwater storage with surface water from local and Imported sources; and
- (4) Monitoring basin parameters for the primary purpose of preventing overdraft.

Moreover, GCID's groundwater management plan will document existing groundwater management activities that serve to accomplish the objectives stated herein.

### **III. GLENN-COLUSA IRRIGATION DISTRICT**

#### **A. *Geography***

GCID is situated in the northern Sacramento River Valley, between Hamilton City, at its northern boundary, and a point just south of the City of Williams, as depicted in Figure 1.

GCID's service area encompasses approximately 175,000 acres located in Glenn and Colusa counties. GCID lies between the Coast ranges on the west and the Sacramento River on the east. The coast range forms the western boundary of the drainage area which contributes recharge to the groundwater basin underlying the GCID service area. Within the northern area of GCID, a broad alluvial fan has been deposited by Stony Creek, Walker Creek and Willow Creek. The valley floor, which comprises most of GCID's service area, is primarily a lowland depression called the Colusa Basin. This flat, poorly drained basin separates the dissected slopes of the Coast Range foothills from the eastern boundaries of the service area. The eastern boundaries of GCID are near the Sacramento River. The river's flood plain deposits form a belt averaging 3 miles wide with man made and naturally built up levees standing higher than the adjoining flat, poorly drained deposits within the GCID service area.

#### **B. *Water Rights***

GCID holds extensive pre-1914 water rights from the Sacramento River and Stony Creek. (Table 1.) GCID's pre-1914 water rights from the Sacramento River date back to 1883. GCID also holds post-1914 water rights from the Sacramento River and various tributaries, as well as riparian rights.

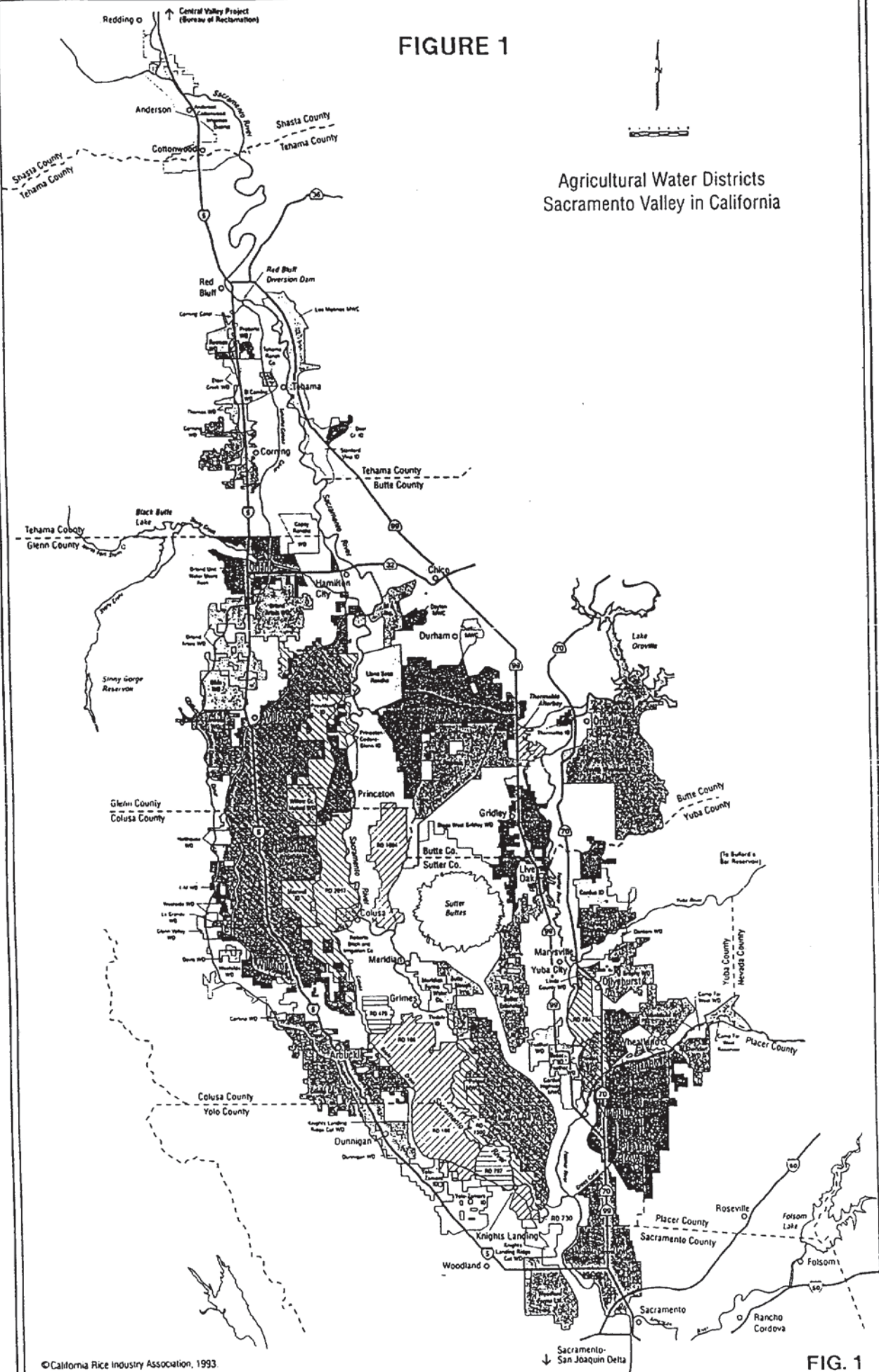
GCID has executed a water rights settlement and supply contract with the United States, which recognizes GCID's entitlement to a minimum of 720,000 ac-ft. of natural flows from the Sacramento River and Stony Creek, and provides for GCID's purchase of 105,000 ac-ft. of federal CVP Project water, resulting in a total seasonal diversion under the contract of 825,000 ac-ft.

GCID presently provides water service to approximately 175,000 acres, which includes nearly 25,000 acres of wildlife refuges. (Figure 2.)

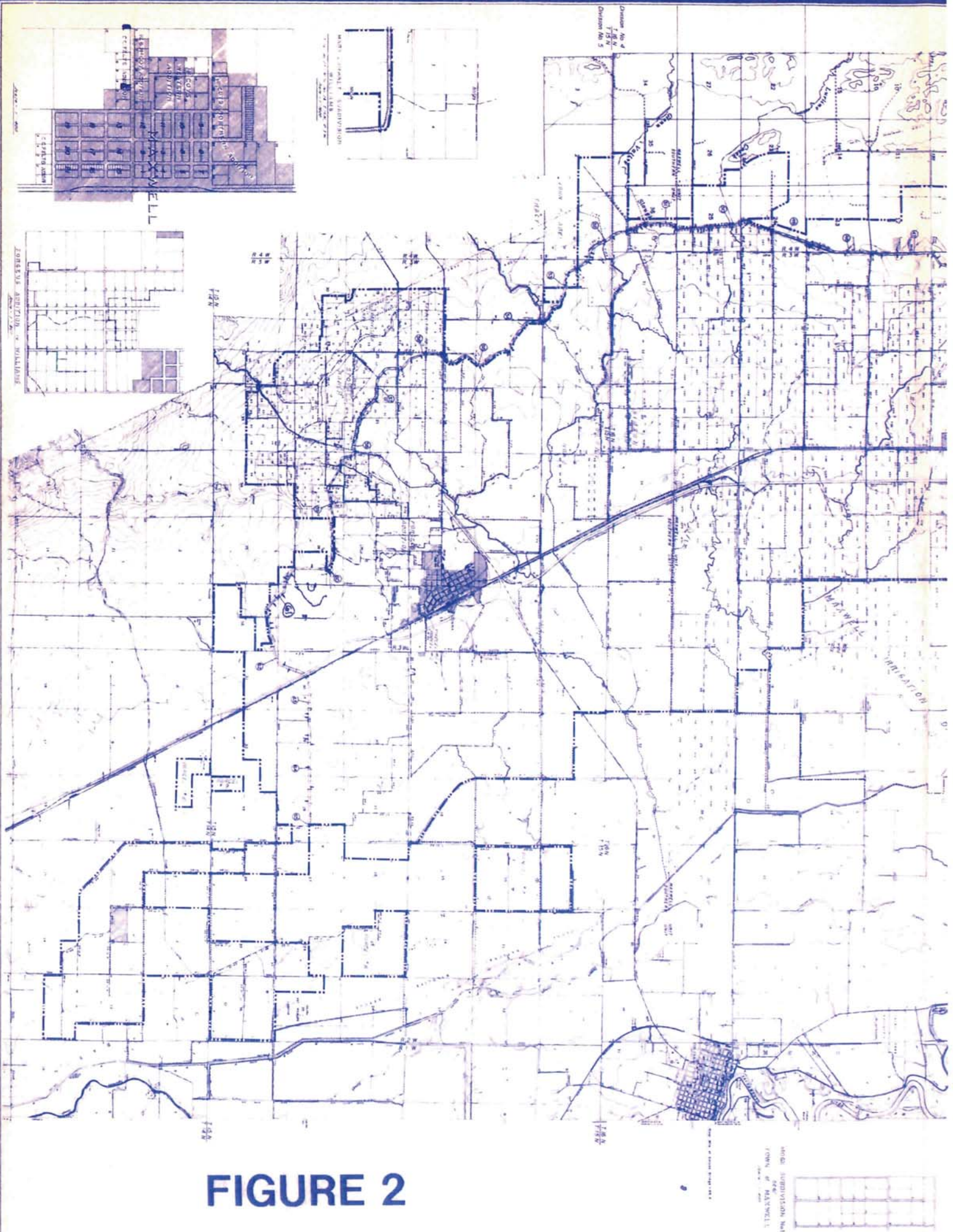


FIGURE 1

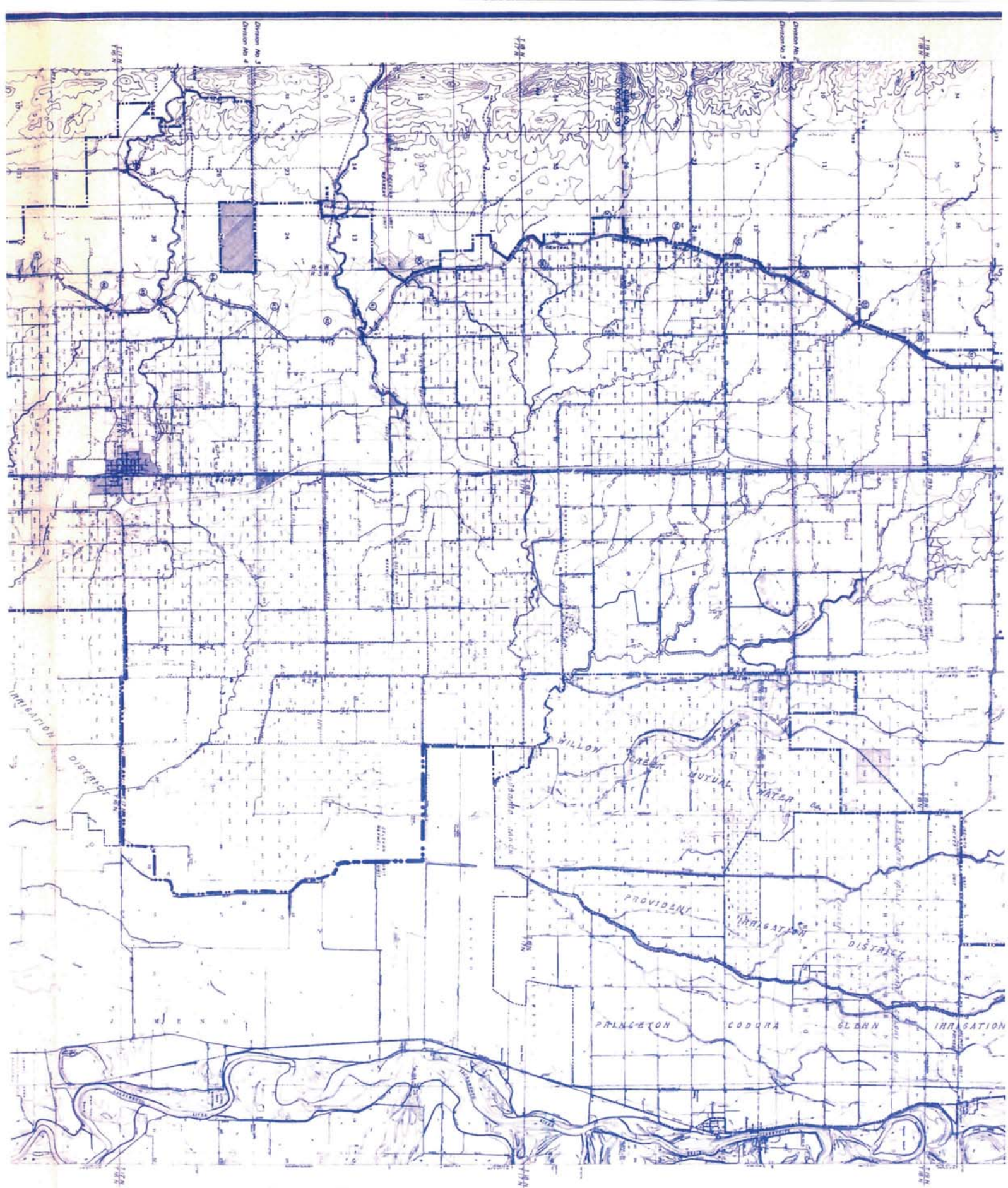
Agricultural Water Districts  
Sacramento Valley in California



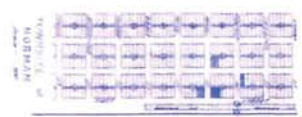








SECTION 10  
TOWNSHIP 10 N  
RANGE 10 E





# GLENN-COLUSA IRRIGATION DISTRICT

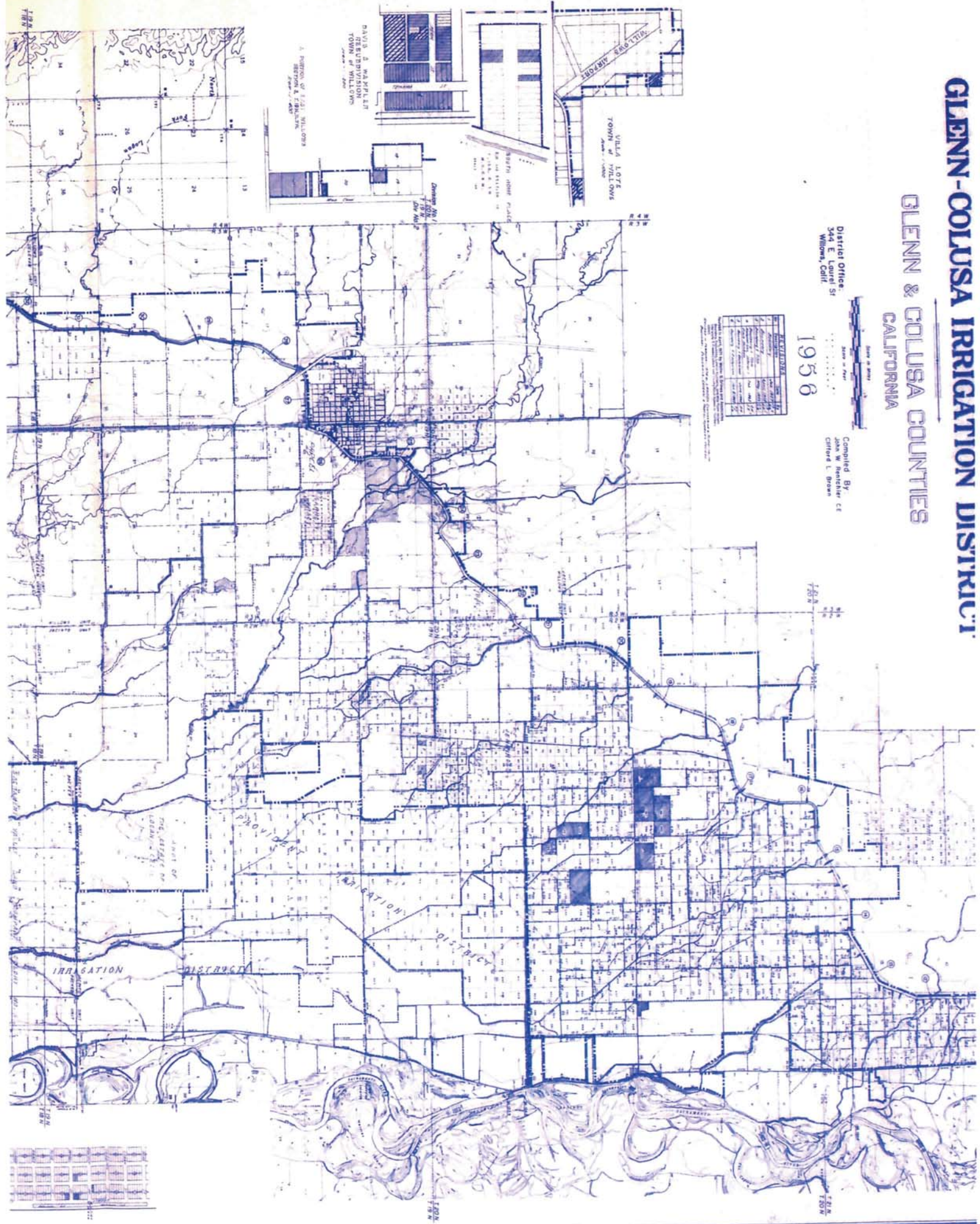
## GLENN & COLUSA COUNTIES CALIFORNIA

District Office,  
344 E. Laurel St  
Willows, Calif.

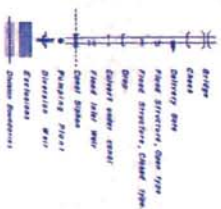
1956

Compiled By  
John W. Renscher, CE  
Clifford L. Brown

Area	Acres	Value
1	1,000	\$100,000
2	2,000	\$200,000
3	3,000	\$300,000
4	4,000	\$400,000
5	5,000	\$500,000
6	6,000	\$600,000
7	7,000	\$700,000
8	8,000	\$800,000
9	9,000	\$900,000
10	10,000	\$1,000,000
11	11,000	\$1,100,000
12	12,000	\$1,200,000
13	13,000	\$1,300,000
14	14,000	\$1,400,000
15	15,000	\$1,500,000
16	16,000	\$1,600,000
17	17,000	\$1,700,000
18	18,000	\$1,800,000
19	19,000	\$1,900,000
20	20,000	\$2,000,000





[illegible]

## END OF THE LINE

GLENN & COLUSA COUNTIES  
CALIFORNIA

**District Office:**  
344 E. Laurel St  
Willows, Calif.

1600

Compiled By:  
John W. Rentchler CE  
Clifford L. Brown

20. VIBRATIONS		
	Score	Mark
a. Explain briefly:	100	100
i. Resonance	20	20
ii. Free vibration	20	20
iii. Damped vibration	20	20
iv. Forced vibration	20	20
v. Harmonic motion	20	20
b. Answer the following questions:	100	100
i. Define simple harmonic motion.	20	20
ii. Derive the expression for the period of a simple pendulum.	20	20
iii. Derive the expression for the period of a mass-spring system.	20	20
iv. Derive the expression for the period of a torsional pendulum.	20	20
v. Derive the expression for the period of a physical pendulum.	20	20

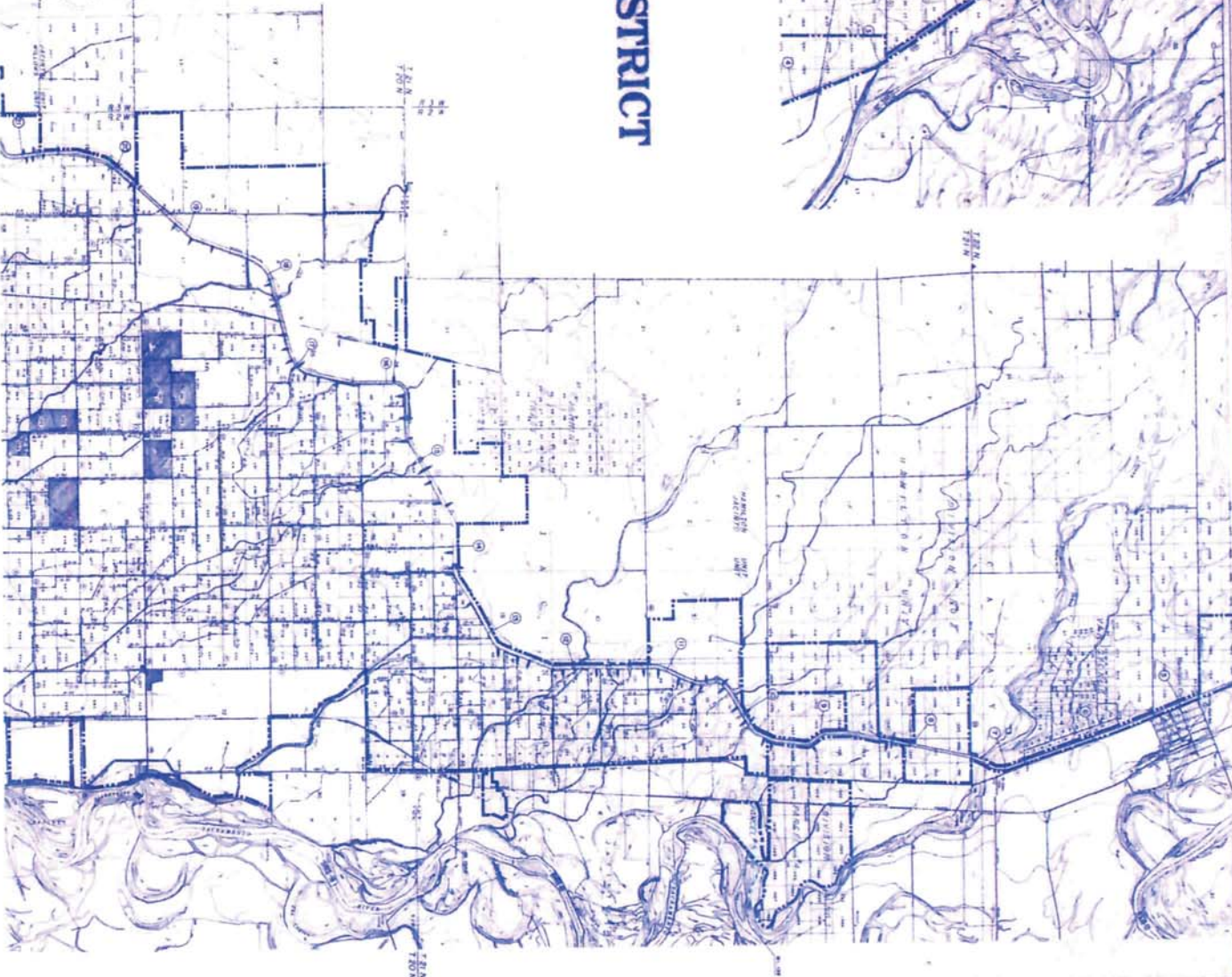
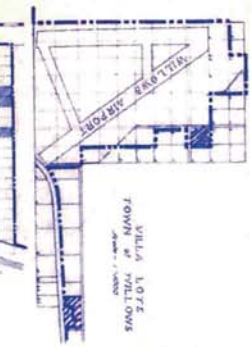


TABLE 1

## APPROPRIATIVE WATER RIGHTS FILINGS

TABLE 1. - Documents pertaining to water appropriations prior to December 19, 1914

Document	Posting date	Claimant	Location of diversion point Approx. Mile	Diversion quantity	Place of use	Source of data
SACRAMENTO RIVER						
Water Notice	12-18-1883	N. D. Rideout	154.8 R	500,000 inches measured under a 4-inch pressure	Plains of Colusa County	Recorded Dec. 21, 1883 in Book "A" of Misc. Records page 81, Records of Colusa County.
Notice of Location of Water Right	11-30-1901	Byron D. Beckwith	154.8 R	150,000 inches measured under a 4-inch pressure	In the Counties of Glenn, Colusa, Yolo, and Solano	Recorded Dec. 7, 1901 in Book 1 of Misc. Records page 626, records of Glenn County.
Notice of Location of Water Right	11-30-1901	Byron D. Beckwith	154.8 R	150,000 inches measured under a 4-inch pressure	In the Counties of Glenn, Colusa, Yolo, and Solano	Recorded Dec. 7, 1901 in Book 1 of Misc. Records, page 632, records of Glenn County.
Notice of Location of Water Right	11-30-1901	Byron D. Beckwith	154.8 R	150,000 inches measured under a 4-inch	In the Counties of Glenn, Colusa, Yolo, and Solano	Recorded Dec. 7, 1901 in Book 1 of Misc. Records, page 632, records of Glenn County.
Notice of Water Location	2-25-1903	Willard M. Sheldon	154.8 R	5,000 c. f. s.	In the Counties of Glenn, Colusa, Yolo, and Solano	Recorded Feb. 26, 1903 in Book 2 of Misc. Records page 53, records of Glenn County.
Notice of Water Location	2-25-1903	Willard M. Sheldon	154.8 R	5,000 c. f. s.	In the Counties of Glenn, Colusa, Yolo, and Solano	Recorded Feb. 26, 1903 in Book 2 of Misc. Records, page 57, records of Glenn County.
Notice of Water Location	11-13-1903	Central Canal and Irrigation	154.8 R	5,000 c. f. s.	In the Counties of Glenn, Colusa	Recorded Nov. 19, 1903 in Book 2 of Misc. Records
Notice of Water Location	4-26-1905	Central Irrigation District	154.8 R	5,000 c. f. s.	Central Irrigation District	Recorded May 5, 1905 in Book 2 of Misc. Records, page 124, records of Glenn County
An Act for the diversion of water from the Sacramento River, in the State of California, for irrigation purposes	5-9-1906	Central Canal and Irrigation Company	Between 152 and 167	900 c. f. s. (a)	Lands of the Sacramento Valley on the west side of the Sacramento River	Congressional Record 1906, H. R. 11796, Public Law No. 151
Notice of Water Location	11-5-1909	Sacramento Valley Irrigation Company	154.8 R	5,000 c. f. s.	In the Counties of Glenn, Colusa and Yolo	Recorded Nov. 6, 1909 in Book 2 of Misc. Records page 388, records of Glenn County



TABLE 1 part 2

## APPROPRIATIVE WATER RIGHTS FILINGS

Document	Posting date	Claimant	Location of diversion point	Diversion quantity	Place of use	Source of data
STONY CREEK						
Notice of Water Location	4-15-1903	M. N. Sheldon	Where Central Canal intersects Creek	5,000 c.f.s	In the Counties of Glenn, Colusa, Yolo, and Solano	Recorded April 16, 1903 in Book 2 of Misc. Records, page 66, records of Glenn County.
Notice of Appropriation	11-21-1904	Central Canal and Irrigation Company	Where Central Canal intersects Creek	5,000 c.f.s	In the Counties of Glenn, Colusa, and Yolo	Recorded Nov. 25, 1904 in Book 2 of Misc. Records, page 105, records of Glenn County.
Notice of Water Location	4-26-1905	Central Irrigation District	Where Central Canal intersects Creek	5,000 c.f.s	Central Irrigation District	Recorded May 5, 1905 in Book 2 of Misc. Records, page 124, records of Glenn County.
WILLOW CREEK						
Notice of Appropriation of Water	8-1-1907	Dr. T. T. Purkett	Location No. 4 Plate 4	2,000 inches measured under a 4-inch pressure	43 acres in N 1/2 Section 11, Township 19 North, Range 3 West	Recorded Aug. 1, 1907 in Book 2 of Misc. Records, page 236, records of Glenn County.

(a) Right granted to divert at all seasons of the year, while and so long as such diversion shall not seriously injure the navigation of said river, an amount of water which, at a stage of said river of two feet above low water, as determined by the United States engineer in charge of the improvement of said river, or at any lower stage, shall not exceed 900 c.f.s

#### IV. GROUNDWATER BASINS WITHIN GCID

GCID overlies an aquifer system that includes both confined and unconfined zones that have historic depths to groundwater of from 5 to 50 feet. The variation is due to the easterly down-sloping of the valley floor and the occurrence of the Willows fault trending southeasterly through the District south of Willows. The District overlies the western arm of a sediment filled structural trough that makes up the Sacramento Valley. This fill material is made up of marine and overlying continental sediments. The water bearing sediments are up to 2,000 feet thick in places. Transmissivities range from very low in the fine grain, silty clay materials of the lower basin (predominantly south of the Willows Fault) to high in the clean, coarse sands and gravel of the Stony Creek fan. Better quality of water and greater permeabilities is also characteristic of the portion of the basin located northeast of the Willows fault. Ground water under-flow is generally to the east and southeast, some of which ultimately reaches the Sacramento River as accretions to the surface water system. Investigations to study the relationship of under-flow interceptions and river accretions are required to determine potential impacts of conjunctive use in the Sacramento Valley.

##### A. *Unconfined Aquifer*

The Southern portion of the groundwater basin (southwesterly of the Willows fault) experiences problems with perched groundwater. The heavy clay soils are underlain by hardpans which intercept the percolation of applied water. The problem is alleviated by an extensive system of open interceptor drains. This drainage system has thirty-six drain recapture sites for which perched ground water is a significant source of supply.

Shallow ground water tables exist at depths to water of 15 feet or less in the northeastern portion of the District. These water levels have declined to 30-40 feet in recent years, due to drought conditions and possibly increased conjunctive use throughout the district.

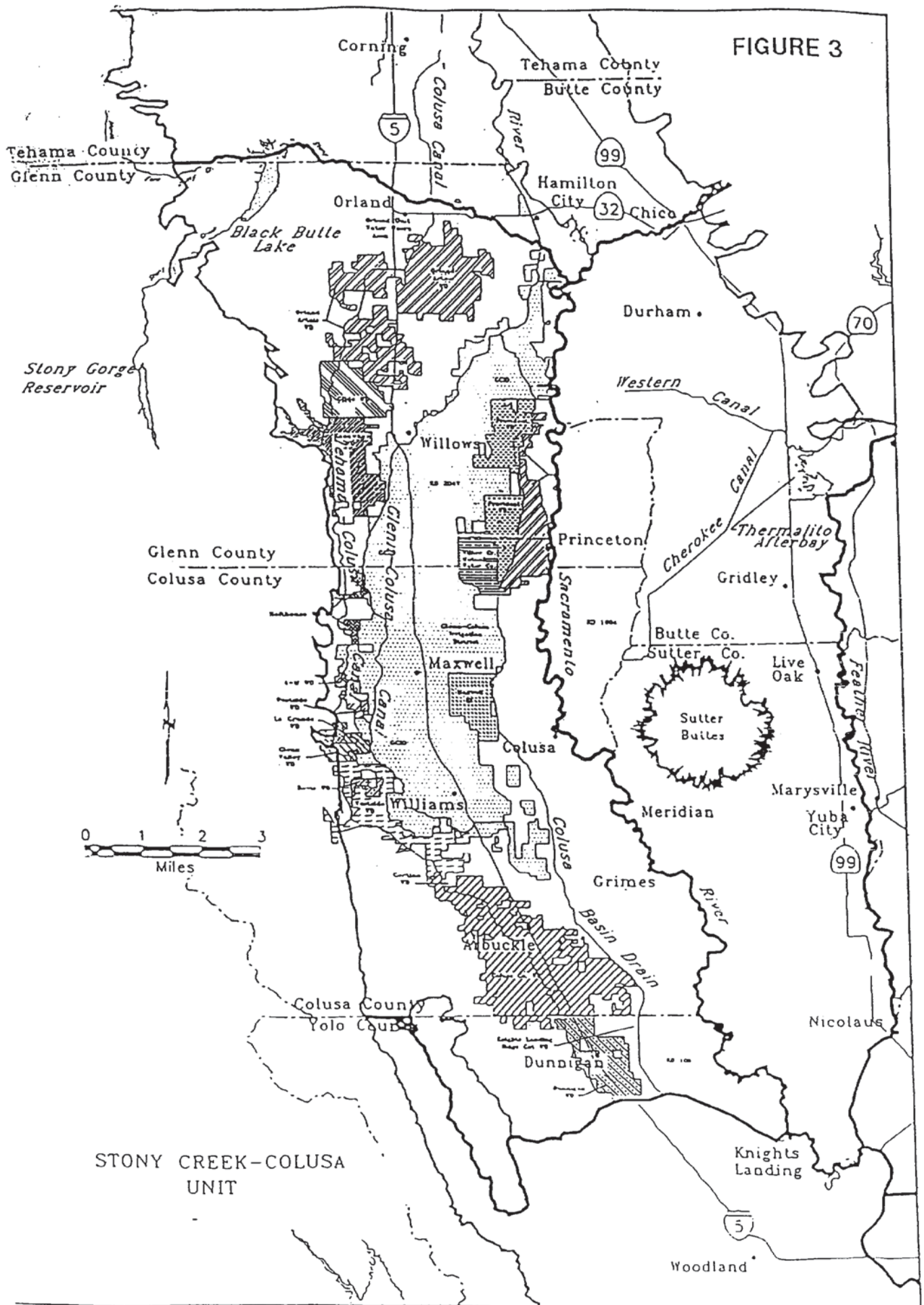
Water from this unconfined aquifer is predominately used for agricultural and municipal purposes. The cost of pumping this water, amortized over 40 years, is approximately \$35/ac-ft. This includes replacement of the well head and drivers in 20 years. The pumping cost does not include contingencies associated with any declining yields due to changes in water levels or pump capacity.

#### **B.     *Confined Aquifers***

A recent test well drilled by GCID in cooperation with DWR, explored strata to 1,000 feet below the surface. The well log indicates several semi-impervious strata which would be classified as aquitards between the upper unconfined water table below 200 feet. Further exploration of the aquifer is required to determine the extent and recharge nature of this aquifer. GCID is currently pumping 1200+ ac-ft from this confined aquifer and monitoring any effects that it may have on numerous monitoring wells in the vicinity. The average electroconductivity is measured at less than .15 mmhos/cm.



FIGURE 3



## V. GROUNDWATER BASIN CONDITIONS

### A. *Water Supply and Demand*

GCID's main sources of water supply are precipitation, surface water diversions, and conjunctive use of groundwater.

Precipitation occurs primarily from winter storms with infrequent light showers during other times of the year. The long term normal annual rainfall over GCID's service area is 17.5". The average evaporation is 72". Precipitation does not satisfy crop-water requirements. Precipitation does however, contribute to groundwater recharge, and the groundwater system receives direct infiltration from district lands.

GCID's settlement contract surface water supply is delivered primarily by diversions from the Sacramento River at R.M. 206 rt. Supplemental deliveries are available through diversions from Black Butte reservoir via the Stony Creek channel, and also by way of three crossties with the USBR's Tehama Colusa canal system.

Conjunctive use of groundwater presently occurs within GCID. Although GCID is primarily a surface water contractor, GCID does operate a 3,300 g.p.m. deep well in conjunction with its seasonal river diversion. Throughout GCID, there are more than 160 ground water wells which are operated by GCID landowners. GCID encourages this well operation, and has entered into voluntary groundwater commingling agreements with GCID's landowners in order to supplement district water supplies.

The effects of increased demands and safe yield quantities on the basin requires increased monitoring efforts, which are discussed in section VII, part B, 1, below.

## **B.     *Water Demand And Balance***

Table 2 lists GCID's crop types and acreage in production for the previous ten years. The inclusion of future USFWS Refuge demands yields an estimated annual projected acreage of 130,000 acres district wide. The net water use for the crop varieties averages 3.5 ac-ft per acre based on data listed in DWR Bulletin 113-4 (1986). Evapotranspiration and consumptive use total approximately 460,000 ac-ft per year. Direct applied water from diversions are estimated at approximately 690,000 ac-ft. Precipitation is not considered significant to meet demands during the growing season other than that stored as soil moisture holding capacity prior to summer months. Annually, precipitation contributes 250,000 ac-ft (17" x 170,000 ac.) to the district watershed.

Drainage outflow from precipitation and agricultural water is roughly estimated at 280,000 ac-ft annually. However, this figure can vary widely based on storm frequency, soil moisture and saturation levels, conservation methods, and recapture operations. The balance of inflow minus outflow primarily indicates that groundwater infiltration may amount to approximately 200,000 ac-ft per year. This water balance with estimates of subsurface flows is depicted in Figure 4.

Table 2  
IRRIGATED CROPS  
(acres)

Crop	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Rice	76,800	72,058	71,547	82,865	81,746	66,827 (2)	62,173	57,955	84,576	95,033
Tomatoes	1,746	2,415	2,208	2,535	4,028	4,495	5,346	3,830	2,933	4,069
Sugar Beets	948	1,045	1,984	1,789	1,387	884	670	759	664	490
Clover/Pasture	4,183	4,369	4,469	4,596	4,510	3,950	3,465	3,264	3,989	5,000
Alfalfa	1,635	1,878	1,707	2,087	2,033	1,660	2,507	2,799	2,477	3,073
Corn	1,382	1,561	906	591	926	976	303	311	335	312
Orchard	1,746	1,472	1,493	1,545	1,640	1,619	1,455	1,406	1,154	1,156
General	8,548	5,477	7,003	5,617	7,384	6,327	2,065	6,275	7,085	4,841
Duck Pond	4,721	4,919	5,030	5,084	4,780	4,692	3,748	3,263	3,174	1,874
One Irrigation	6,879	4,552	5,195	6,123	3,270	8,327	7,341	4,501	6,743	7,753
Sec. Irrigation (1)	3,155	671	1,963	2,624	1,432	3,413	1,160	531	2,123	3,945
Cotton	(na)	(na)	(na)	(na)	(na)	(na)	(na)	(na)	(6)	969
Rice Straw Decomp. (5)	(na)	(na)	(na)	(na)	(na)	(na)	(na)	1,320	5,771	9,256
Subtotal	109,042	100,548	102,219	113,611	112,473	100,470	89,559	84,830	113,679	125,390
Refuges										
Rice	606	630	577	411	202	0	0	0	0	0
General	1,876	1,891	1,891	1,750	1,750	1,178	360	826	913	2,473
Duck Pond	10,790	11,110	12,015	12,322	12,322	12,817	12,943	13,520	13,687	12,897
Subtotal	13,272	13,631	14,483	14,483	14,274	13,995	13,303	14,346	14,600	15,370
TOTAL	122,314	114,179	116,702	128,094	126,747	114,465	102,862	99,176	128,279	140,760
USDA Acreage										
Allotment Changes	-35%	-35%	-35%	-25%	-25%	-20%	-5% (3)	0% (4)	-15%	0%
First subtotal includes these acreages irrigated for Provident and Princeton-Cordora-Glenn Irrigation Districts.										
Provident	387	698	573	682	682	626	466	447	529	725
Princeton-Cordora-Glenn	67	104	104	97	87	87	20	20	20	95

(1) Second Irrigation is included in One Irrigation.

(2) The reduced rice acreage in 1990, with a 5% decrease in the set aside program from 1989, was due to the late May rainstorms, after which the District was allocated a full water supply.

(3) Due to water cutback, growers did not have enough water to plant 95%.

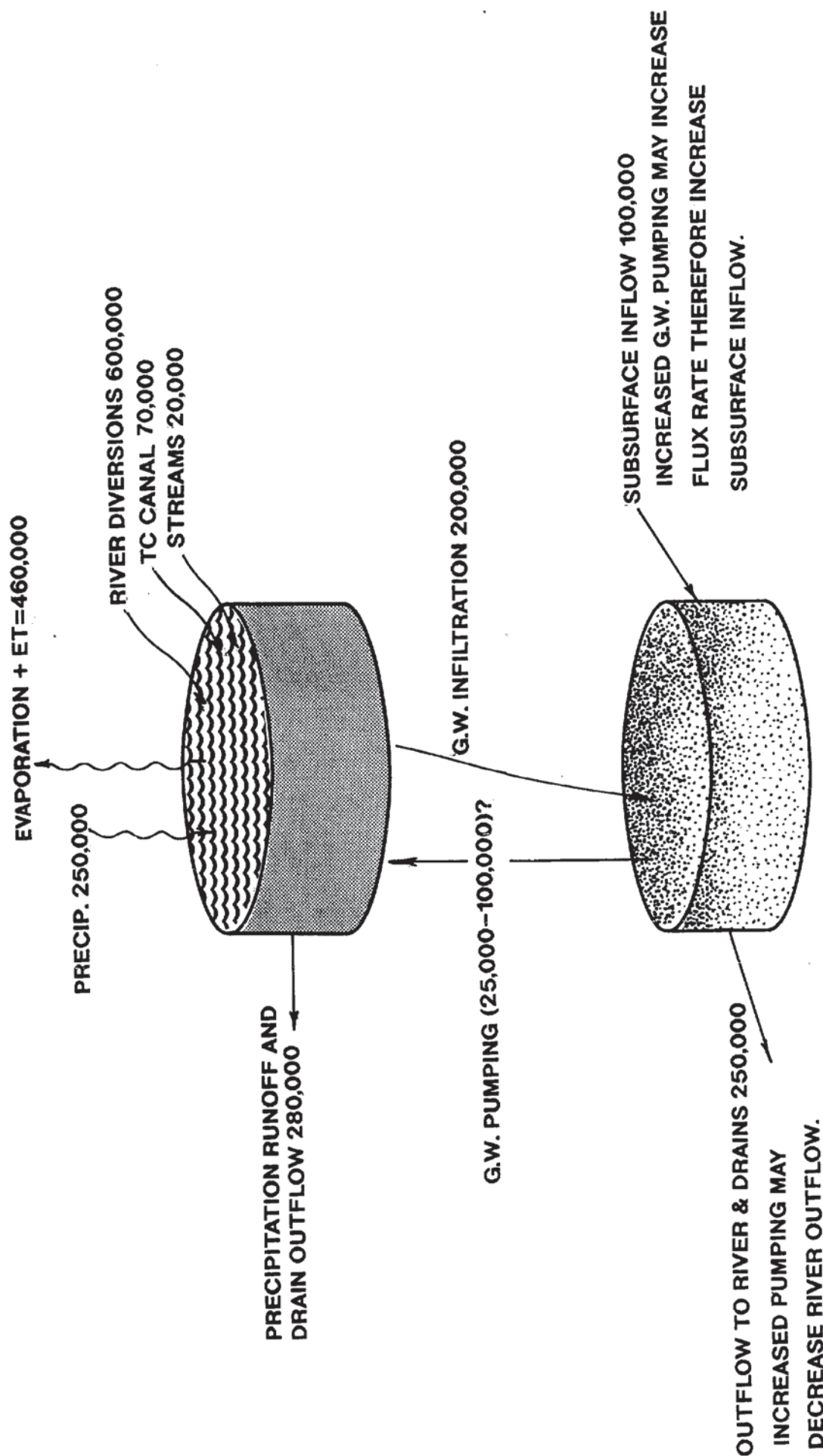
(4) Due to water cutback, growers did not have enough water to plant 100%.

(5) Rice Straw decomposition is an experimental alternative to rice straw burning, and is not included in first subtotal.

(6) Cotton acreage included in General crop listing in 1993.



# SURFACE WATER/GROUNDWATER BALANCE (ACRE-FEET)



**FIGURE 4**

### C. *Groundwater Use*

Groundwater use within GCID is directly related to the availability of surface water supplies for the water year. Regulatory restrictions on GCID's diversions from the Sacramento River, due to ESA compliance or drought year water allocations, have been offset to a degree by increased groundwater supplements. This supply is made available from over 160 privately owned wells within the district in addition to the district's well.

GCID has entered into voluntary commingling agreements and purchase agreements to firm up groundwater supplies for the water year. An example of such annual fluctuations on groundwater acre foot demand is shown in Table 3.

**TABLE 3**

WATER YEAR	TYPE	GROUNDWATER SUPPLY FROM COMMINGLING & PURCHASE	ESTIMATED OTHER WITHDRAWS	TOTALS
1992	Critical	27,386	61,000	88,000
1993	Full Supply	-0-	20,000	20,000
1994	Dry	52,152	43,000	95,000

Additional groundwater is extracted in the district for individual residential use, non-district land agricultural use, and municipal and industrial use. This use is roughly estimated at a minimum of 20,000 acre feet.

#### ***D. Groundwater Levels***

The Department of Water Resources monitors groundwater wells throughout the district, both in Glenn and Colusa counties. Changes in groundwater levels show annual fluctuations ranging from a few feet in the basin portion of the district (an area of low demand) to 15-20 feet in the Stony Creek and alluvial fan areas. Long term trends also show the effects of the 1976-77 and 1986-93 droughts. All ground water wells show recovery from the 1976-77 drought due to the extreme wet period of the early 1980's. Wells are also showing recovery from the increased demand of the recent drought. The substitution of surface water diverted by the USBR's Tehama-Colusa canal has also led to reduction of seasonal fluctuations and an increase in groundwater level elevations in some district wells.

Groundwater recharge occurs by local creeks, precipitation, GCID canal service and the Sacramento River when the surface level is higher than adjacent groundwater level (a process known as seepage.) Generally, higher permeabilities and greater recharge exist in the northern portion of the District, particularly in the area of the Stony Creek fan. This results in groundwater underflow to the east and southeast towards the Sacramento River where such underflow contributes to river accretions.

Hydrographs produced by the Department of Water Resources for wells within the district boundary for various years between the 1930's and 1993, as well as a typical groundwater basin cross section, are supplied in Appendix B.

## **E.     *Water Quality***

GCID's water quality measurement program results are listed below, and indicate that the available water supply is within class I standards. GCID performs tests for pH and electroconductivity throughout the district on a regular predetermined basis. The quality of surface water is good, with an average electrical conductivity (E.C.) of .50 mhos/cm. The average E.C. of the Sacramento River water is .20 mhos/cm. The surface drain water recaptured during 1993 had an average E.C. of 0.47. Tables 4 and 5 depict surface water quality data for various areas of the district.

### **1.     *Groundwater Quality Monitoring***

Groundwater quality is and has been monitored at the District's well. Collected test data is presented in Table 6. As is typical in the northern section of the District, the ground water is of adequate quality for crop irrigation. The boron concentration and the total dissolved solids are sufficiently low to qualify as class I irrigation water. This is not the case for the groundwater quality in the southern half of the District.



## 2. *Water Quality Problems*

District lands located south of the Willows fault have experienced problems with excess boron in groundwater and high TDS, frequently in excess of 5,000 mg/l.

Very serious groundwater quality problems occur between Maxwell and Arbuckle (Township 18 through 14 North, and Range 3 through Range 1 West, MDB&M). Unusually high concentrations of sodium, chloride, and sulfate occur in this region. Total dissolved solids average around 500 mg/l and samples have registered in excess of 1,000 mg/l. The suspected sources of the salinity are mineral springs in contact with marine sediments emanating from the Rumsey Hills and the Sutter Buttes areas. The groundwater used in this region is usually blended with surface water to the extent required to make it suitable for crop irrigation.

**TABLE 4**  
Electrical Conductance  
(mmhos/cm)

Year	April	May	June	July	August	Sept.	Oct.	Mean
Mean of District Outflow								
1984	0.40	0.33	0.35	0.34	0.31	0.34	0.35	0.34
1985	0.67	0.30	0.39	0.39	0.30	0.33	0.34	0.35
1986	0.57	0.29	0.36	0.29	0.31	0.33	0.31	0.33
1987	0.41	0.33	0.36	0.32	0.34	0.37	0.32	0.35
1988	0.28	0.33	0.39	0.37	0.35	0.36	0.30	0.34
1989	0.48	0.33	0.40	0.35	0.37	0.32	0.53	0.38
1990	0.45	0.36	0.47	0.39	0.36	0.35	0.30	0.38
1991	0.52	0.38	0.48	0.36	0.37	0.39	0.41	0.42
1992	0.62	0.43	0.44	0.45	0.48	0.45	0.43	0.47
1993	0.53	0.47	0.55	0.45	0.45	0.46	0.44	0.47
Colusa Drain at Davis Weir (D-13)								
1984	0.72	0.36	0.39	0.41	0.41	0.42	0.39	0.41
1985	0.70	0.24	0.47	0.46	0.34	0.37	0.35	0.35
1986	0.70	0.26	0.32	0.30	0.26	0.39	0.34	0.34
1987	0.28	0.40	0.30	0.28	0.41	0.39	0.47	0.36
1988	0.25	0.50	0.36	0.59	0.48	0.46	0.26	0.43
1989	0.75	0.28	0.60	0.52	0.48	0.41	0.44	0.48
1990	0.83	0.50	0.60	0.62	0.48	0.43	0.65	0.56
1991	0.68	0.50	0.68	0.51	0.53	0.56	0.56	0.57
1992	1.04	0.48	0.65	0.65	0.81	0.52	0.69	0.64
1993	0.43	1.12	1.00	0.85	0.62	0.72	0.44	0.62
Main Canal at Mile 8.2 (D-14)								
1984	0.18	0.20	0.15	0.16	0.15	0.20	0.18	0.16
1985	0.20	0.22	0.14	0.13	0.14	0.14	0.16	0.15
1986	0.20	0.18	0.23	0.12	0.18	0.18	0.12	0.14
1987	0.18	0.12	0.14	0.12	0.14	0.18	0.12	0.14
1988	0.15	0.15	0.16	0.16	0.14	0.14	0.12	0.15
1989	0.19	0.14	0.16	0.12	0.12	0.14	0.18	0.14
1990	0.18	0.16	0.14	0.15	0.14	0.18	0.14	0.16
1991	0.14	0.16	0.17	0.18	0.14	0.13	0.14	0.15
1992	0.19	0.17	0.15	0.16	0.14	0.13	0.17	0.16
1993	0.19	0.14	0.14	0.14	0.12	0.14	0.15	0.14

EC values shown are weighted with respect to flow.



TABLE 5

## SUMMARY OF WATER QUALITY TESTS 1993

Specific Electrical Conductance and Temperature (1)

Location	January	February	March	April	May	June	July	August	September	October	November	December	April-Oct.	Yearly
	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	E.C. °F	Mean (°F)	Mean (°F)
D1 Salmon Hole	0.36 56	0.48 52	0.70 82	0.81 54	0.49 66	0.60 78	0.52 71	0.53 78	0.41 71	0.39 63	0.26 60	0.26 50	0.43 68	0.37 64
D2 Bondurant	0.30 54	0.54 52	0.47 82	0.40 82	0.36 61	0.48 66	0.50 70	0.48 72	0.50 75	0.28 64	0.24 60	0.32 54	0.44 67	0.40 63
D3 Ditch 33	0.40 52	0.55 53	0.60 82	0.59 56	0.44 60	0.43 66	0.56 68	0.40 71	0.40 74	0.33 65	0.29 50	0.36 52	0.41 66	0.42 62
D4 Logan Creek	0.36 48	0.57 50	0.75 60	0.73 60	0.81 67	0.70 73	0.55 74	0.57 78	0.54 72	0.59 64	0.53 56	0.45 51	0.63 70	0.42 63
D5 2047 Saddle	0.40 54	0.58 54	0.60 64	0.62 60	0.41 62	0.50 68	0.50 68	0.50 71	0.48 71	0.50 66	0.58 60	0.55 52	0.47 67	0.46 63
D6 Willow Creek	0.34 53	0.49 52	0.62 61	0.58 58	0.38 65	0.34 68	0.58 72	0.58 72	0.44 77	0.40 64	0.38 60	0.50 52	0.42 68	0.36 63
D7 Hurren Creek	0.26 50	0.66 52	0.60 60	0.54 56	0.50 68	0.46 74	0.48 78	0.43 72	0.48 72	0.56 63	0.40 58	0.53 54	0.41 70	0.35 64
D8 Stone Corral	0.32 52	0.70 51	0.80 60	0.44 56	0.50 66	0.56 72	0.43 72	0.43 70	0.42 71	0.37 64	0.38 57	0.34 50	0.44 68	0.42 62
D9 Kuhl Weir	0.30 54	0.90 52	1.00 60	0.78 56	0.48 64	0.56 74	0.34 72	0.37 70	0.43 68	0.48 62	0.48 58	0.45 50	0.43 68	0.46 62
D10 Section 25	0.24 52	0.71 50	0.84 60	0.51 58	0.38 68	0.50 78	0.40 72	0.38 72	0.41 70	0.51 64	0.44 58	0.87 49	0.44 68	0.36 63
D11 Freshwater	0.32 54	1.10 51	1.30 60	0.75 58	0.62 66	0.84 78	0.48 78	0.62 71	0.54 70	0.76 64	0.81 59	0.91 51	0.60 68	0.49 63
Mean :	0.30 53	0.69 52	0.63 61	0.63 58	0.47 65	0.55 72	0.45 72	0.45 72	0.46 72	0.44 64	0.41 59	0.43 51	0.47 66	0.50 63
D12 2047 Colusa (2)	0.50 52	0.40 51	0.63 61	0.63 58	1.10 69	0.78 78	0.85 78	0.85 78	0.56 71	0.84 63	0.84 60	0.53 51	0.81 71	0.55 64
D13 Davis Weir (2)	0.48 52	0.64 51	0.68 62	0.43 61	1.12 70	1.00 78	0.85 82	0.82 72	0.72 70	0.44 68	0.60 61	0.53 51	0.82 72	0.55 65
D14 M.I. 8.2 Canal (4)	0.18 53	0.24 52	0.31 60	0.19 56	0.14 60	0.14 65	0.14 68	0.12 68	0.14 68	0.15 62	0.15 60	0.17 53	0.14 63	0.20 60
D15 2047 Princeton (2)	0.34 50	0.61 52	0.65 60	0.61 60	0.58 66	0.58 72	0.40 72	0.47 70	0.54 68	0.41 63	0.58 60	0.51 54	0.53 68	0.62 62

(1) Electrical Conductance (E.C.) in millimhos/cm (mmhos/cm) is an indication of Total Salt Content.

Class I Suitable for irrigation under most conditions 0-1 mmhos/cm

Class II (Depends upon crop, climate, etc.) 1-3 mmhos/cm

Class III (Unsuitable under most conditions) Above 3 mmhos/cm

Water Quality Criteria, 2nd Edition; State of California, Water Resources Control Board

Publication 3-1-A, Page 273.

Data is correct to 27°

E.C. = millimhos/cm Electrical Conductance - Measured by GCID with conductivity water meter.

Q = Cubic Feet per Second - Estimated from GCID measurements.

°F = Degrees Fahrenheit - Measured at time of sampling.

(2) E.C. values shown in "Mean" column are weighted with respect to flow.

(3) D12 represents the combined flows of D1 through D11 plus several drains from areas outside GCID.

(4) D14 represents the water supply from the Sacramento River plus Stony Creek.



Engineers  
Planners  
Economists  
Scientists

## TABLE 6

Report To: GCID  
CH2M Hill/RDD  
RDD 27356.ES.02  
Attention: Gerald Vogt  
Sample Description: Water  
Date of Sample: 7/25/89

Reference Number: 23854  
Page 1 of 1  
Date: 8/22/89  
Phone:  
Sampled By: G. Vogt  
Date Received: 7/25/89

TEST	METHOD BLANK	PW-1	UNITS	DETECTION LIMIT	DATE ANALYZED	METHOD NUMBER
Total Dissolved Solids	---	245	mg/l	3	8-1-89	160.1
Magnesium	<0.05	17.6	mg/l	0.05	8-2-89	200.7
Calcium	0.063	32.1	mg/l	0.05	8-2-89	200.7
Sodium	<0.2	27.6	mg/l	0.2	8-2-89	200.7
Manganese	<0.001	<0.001	mg/l	0.001	8-2-89	200.7
Iron	<0.04	<0.04	mg/l	0.04	8-2-89	200.7
Alkalinity @ CaCO <sub>3</sub>	<1	165	mg/l	1	8-8-89	310.1
Chloride	<1	22.7	mg/l	1	8-2-89	325.1
Sulfate	<1.0	18.6	mg/l	1.0	8-15-89	375.4
Boron	<0.04	0.16	mg/l	0.04	8-2-89	200.7
Potassium	<1.0	1.0	mg/l	1.0	8-2-89	200.7
Nitrate/Nitrite @ N	<0.03	1.55	mg/l	0.03	8-3-89	353.3
Nitrite @ N	<0.01	<0.01	mg/l	0.01	7-25-89	354.1

Comments: mg/l = milligrams per liter.

The information shown on this sheet is test data only and no analysis or interpretation is intended or implied.

Approved By: 

DW 8-22-89



## F. *Known Problems*

Preliminary information indicates potential physical and operational problems could occur if large scale conjunctive use programs are initiated without proper management. Some potential problems are:

- o Assumptions of yield are often based on insufficient grid tests. Actual well tests show large variations in yield, from 100 g.p.m. or less up to 2500 g.p.m. within a distance of one mile. This lack of performance data requires additional safe yield information;
- o Salt water underlies the entire valley at depths ranging from 400 to over one thousand feet;
- o Soil types in some areas are subject to subsidence if over pumping occurs;
- o Some groundwater is warmer than surface water, which promotes algae growth, which in turn creates a sludge that plant seedlings cannot penetrate; this can cause yield reductions.

- o During dry periods, heavy groundwater pumping can cause groundwater flows to reverse directions away from valley streams and rivers. If groundwater pumping ceases and/or reverses the existing flow to the river, river flows could be reduced, and the valley's firm yield could be reduced. However, if recharge, either induced or artificial, was performed using high winter and spring flows, then the basin firm yield could be increased. Flows available for recharge are those surplus to existing Delta outflow requirements.



## **VI. POWERS GRANTED GCID UPON ADOPTION OF PLAN**

### **A. *Rules and Regulations***

Pursuant to Water Code section 10753.8, GCID may adopt reasonable rules and regulations to implement and enforce its groundwater management plan, with due consideration given to (1) controlling extractions, and (2) the potential impacts of any rules and regulations on agricultural operations and business activities, and the minimization of any adverse impacts. (See Water Code section 10753.9).

### **B. *Financing***

Pursuant to Water Code section 10754, GCID may levy and collect fees and/or assessments in order to finance its groundwater management plan and program. Pursuant to section 10754.2, such fees would pay for GCID's groundwater management plan expenses, such as acquisition of replenishment water, administrative and operating costs, and program studies. Pursuant to section 10754.3, these fees must be authorized by a majority of votes in an election held within the District's boundary on the proposition of whether or not GCID shall be authorized to levy an assessment, or fix and collect fees.

### **C. Replenishment District**

Pursuant to section 10754, GCID may, upon official adoption of this plan, exercise the powers of a Water Replenishment District, as enumerated in Water Code sections 60220 *et seq.* (See Appendix C.) Pursuant to these powers, GCID may perform the following:

- (1) Buy or sell water for replenishment;
- (2) Distribute water to persons in exchange for ceasing or reducing groundwater extraction;
- (3) Spread, sink, and/or inject water into the underground; and
- (4) Store, capture, transport, reclaim, purify, or otherwise manage and control water for the beneficial use of persons or property within the District, and build the necessary works to achieve groundwater replenishment.

## VII. ELEMENTS OF GROUNDWATER MANAGEMENT PLAN

### A. *General*

#### 1. *Area Covered by Plan*

GCID's initial groundwater management plan includes only those lands within the boundaries of the District, as shown on the official District map. (Figure 2.) Water Code section 10750.7 prohibits management of groundwater within the service area of any other local agency providing water service, a mutual water company, or a water corporation regulated by the Public Utilities Commission, absent an agreement with those other local agencies. Pursuant to section 10755.2, GCID shall explore the opportunities to enter into a coordinated joint powers agreement, memorandum of understanding, or other contractual agreement with other public entities or private parties for the purpose of implementing a coordinated groundwater management plan. At this time, GCID has not entered into such agreements, and therefore, GCID's groundwater management plan applies only to the groundwater within its exclusive service area.

Notwithstanding the above, GCID recognizes that effective groundwater management planning may eventually require coordinated planning efforts for the entire area overlying the Stony-Colusa Basin, a sub-basin of the Sacramento Valley Groundwater Basin. The sub-basin, depicted in Figure 3, comprises about 850,000 acres of the larger Sacramento Basin (3.8 million acres). GCID's service area of approximately 175,000 acres comprises approximately 19% of this sub-basin. Therefore, GCID recognizes that future groundwater management of this sub-basin will likely



require a joint powers agreement, memorandum of understanding, or other contractual agreement with appropriate entities and parties within the sub-basin boundary.

Pursuant to section 10755.4, GCID's groundwater management plan shall not apply to small domestic wells within the District's boundaries which pump groundwater for single unit residences.

**B.     *Plan Components***

GCID's groundwater management plan includes components enumerated in Water Code section 10753.7. Related practices and methods are discussed within the components listed below. GCID's groundwater management plan may not be limited to these components, since other components may be adopted as the Board of Directors deems necessary to promote efficient management of its groundwater resources in the future.

**1.     *Monitoring of Groundwater Levels and Storage***  
***(Section 10753.7(g)).***

Initially, the primary component of GCID's groundwater management plan is to conduct a regular program of monitoring groundwater levels throughout the District. This component will provide information on groundwater storage changes, and assist in more accurate determinations of safe yield estimates for the aquifer. This component will also include studies of the groundwater basin's hydraulic properties such as permeability, infiltration rates, specific yield and transmissivity, and the vertical and horizontal extent of the sub-basin. To accomplish this monitoring program component, GCID will attempt to implement the tasks enumerated in the work plan discussed below in Part VII, Section A, 3.

**2.     *Administration of Well Abandonment and Well***  
***Destruction Programs (Section 10753.7(d))***

The District shall support the agencies having jurisdiction over implementing and enforcing Water Code sections 13700 through 13806 which require proper destruction of wells. The district will cooperate with these agencies to facilitate compliance with the State's Model Well Ordinance (SWRCB Resolution No. 89-88) or standards set forth in Department of Water Resources Bulletins 74-81 and 74-90.

### **3.     *Replenishment of Ground Water Extracted by Producers (Section 10753.7 (f))***

The District recognizes that the replenishment of groundwater is an important management technique, because it can increase the yield of the sub-basin. Deep percolation of excess applied District surface waters provides significant recharge, and GCID will continue to encourage this practice. As a result, GCID's final work plan may include the following:

- o     Assessments of local geology to determine areas where surface water may be most efficiently percolated to the basin;
- o     Investigate the development of facilities to retain surplus flows of diversions or runoff, and divert them to high percolation areas such as intermittent stream beds (*i.e.* Stony, Willow, Walker, Funks, Freshwater and Sand Creeks, drainage channels and gravel pits);
- o     Identify existing quantified recharge activities;
- o     Compile current recharge estimates to include:
  - i)     Quantified artificial recharge;
  - ii)    Incidental recharge;
  - iii)   Quantified natural recharge;
- o     Select data storage system;
- o     Determine adequacy of quantification methods;

- -



- o Improve estimates; and
- o Develop more detailed data on stream gaging and Sacramento River gaging to improve water balance

4. *Facilitating Conjunctive Use Operations (Section 10753.7 (h))*

Conjunctive use operations are defined in DWR Bulletin 118-80 as:

Operation of the groundwater basin in coordination with a surface water reservoir system. The basin is intentionally recharged in years of above average precipitation so ground water can be extracted in years of below average precipitation when surface water supplies are below normal.

Such operations are similar to managing a surface water reservoir. GCID has indirectly facilitated conjunctive use since its formation by (1) recharge with applied surface water for irrigation, and (2) promoting supplemental use of groundwater when dry year criteria requires reductions in surface water allocations. GCID will continue this limited conjunctive use program and shall evaluate opportunities for a more comprehensive future program. The recommended study plan for this component includes the following:

- o identify reliable sources of surface water to be used for recharge in years of high precipitation;

- o identify conveyance facilities required to import water for recharge, and how to best recharge the aquifer;
- o determine useable storage in the aquifer consistent with optimization of the aquifer yield;
- o identify required extraction facilities and distribution facilities for surface water and groundwater; and,
- o identify any associated geologic or environmental consequences of the conjunctive program.

**5. *Identification of Well Construction Policies (Section 10753.7 (i))***

GCID supports the local counties' policies regarding well construction, and destruction, and will cooperate with them to provide information to GCID's well owners regarding proper well construction and destruction. GCID recognizes that improperly constructed or destructed wells can result in poor yields and groundwater contamination by providing a pathway for pollutants to the aquifer and/or allow transfers of varying quality waters between different aquifers. Thus, GCID shall recommend standards for construction consistent with Water Code sections 13700 through 13806, and local ordinances.

**6. *Construction and Operation of Ground water Management Facilities (Section 10753.7 (j))***

Optimum groundwater basin management may require the planning and construction of certain project facilities to assure that the quantity and quality of groundwater in storage shall meet long-term demands. Future studies and evaluations of the monitoring program may reveal the need for investigation, construction and operation of the following types of facilities:

- o Groundwater recharge facilities such as spreading grounds, percolation basins, injection wells and surface water delivery systems, to effectively replace groundwater extracted by producers;

- o Groundwater extraction projects that can be selected to conform to optimization of the aquifer (*i.e.*, expanding well capacity in areas of groundwater mounding or controlled extractions in areas with water quality problems); and,
- o Water recycling and recapture projects to relieve demands on the groundwater basin when warranted.

**7. *Coordination With Federal, State and Local Government On Land Use (Section 10753.7 (k))***

GCID recognizes that many land use decisions that result in specific zoning will impact both water supply and water quality. Traditionally, local planning agency land use decisions are made with little or no input from water supply agencies. As a result, GCID will develop communications with local planning agencies in Glenn and Colusa counties, regulatory agencies and private individual landowners to coordinate land use decisions and water supply reality. GCID recognizes that the SWRCB is the lead state water agency responsible for maintaining water quality standards and protection efforts and will work with them to ensure district compliance with those standards. Planning efforts on a federal level, EPA being the lead agency, shall conform with NEPA requirements and the CWA. Working with these agencies shall assure conformity with approved management practices and avoid duplication of efforts.



## **VIII. IMPLEMENTATION OF PLAN**

Upon adoption of this plan, GCID may proceed to implement the following work plan, as deemed necessary by the Board of Directors, to manage groundwater within the district. Initially, GCID shall perform the following tasks in order to commence implementation of its groundwater management plan:

- (1) Establish and proceed with a Basin Management Committee;
- (2) Prioritize data needs;
- (3) Implement a monitoring program; and
- (4) Develop an annual report.

Each of these items are discussed separately below. Upon completion of this initial phase of its plan, GCID will evaluate its planning efforts, and determine the most effective method to continue implementation of the plan.

1. *Basin Management Committee*

- o GCID will establish a Basin Management Committee by selecting appropriate representatives from public, local and private interests.
- o The Basin Management Committee will determine responsibilities or duties that representatives can perform
- o The Basin Management Committee will develop and establish a procedure for any groundwater management plan amendments.
- o The Basin Management Committee will create a technical advisory sub-committee (TAC) to suggest plan amendments or modifications for Board adoption. The TAC should also set action limits to initiate any necessary mitigation measures. For example, if overdraft occurs, then certain requirements may be imposed upon withdrawals (i.e., if water levels at "X" number of wells drop below "Y" water elevation, then extraction limits may be imposed).
- o The Basin Management Committee will develop and recommend the adoption of rules and regulations pursuant to Water Code section 10753.8.
- o The Basin Management Committee will develop and prepare a proposed budget depicting costs and revenue sources.

## 2. *Prioritize Data Needs*

GCID's staff, and any representatives designated by the Basin Management Committee, will take the following steps to acquire, develop and prioritize available data for the purpose of implementing GCID's groundwater management plan:

- Coordinate with federal, state and local agencies, and private individuals to determine available groundwater data.
- Inventory existing data and determine what data can be incorporated into GCID's groundwater management plan database.
- Review existing land use plans and evaluate potential impacts on basin groundwater quantity and quality, well head protection areas, and zones of recharge.



### 3. *Implementation of Monitoring Plan Component*

District staff, and any representative designated by the Basin Management Committee, will take the following steps to implement the monitoring program component:

- o Assure that monitoring sites depict three dimensional character of groundwater basin.
- o Identify any existing sub-basins.
- o Construct facilities (i.e., monitoring tubes, and horizontal and vertical control datum) to commence monitoring groundwater levels.
- o In cooperation with GCID's well owners, GCID will develop an inventory of groundwater wells throughout the district, and maintain records on those wells.
- o Where permission has been granted by the specific well owner, GCID will obtain from the owner and/or well driller, available well log and pump testing data for all wells constructed within the district.
- o Improve methods of estimating the quantities of water pumped from selected wells by measuring with meters, using power consumption data, and/or estimating crop consumptive use.

- o Obtain written permission to enter upon well owners' lands for monitoring purposes. This permission to enter shall not create a right to pass if the permission is subsequently revoked by the well owner.
- o Map and plot well locations accurately. Relate production site locations to standard USGS quad system topographic maps, and digitize information to standard GIS format. Assign standard DWR well number designations to wells.
- o Upon permission of affected well owners, install sounding manifolds where necessary for measurement purposes.
- o Monitor spring and fall water elevations, and select sites for continuous groundwater level recorders.
- o Determine the amount of groundwater extracted in the District.
- o Enter collected data into a computer database such as the AWWA groundwater data management program.
- o Prepare maps and graphs to depict temporal trends of selected data, which may be necessary for the efficient management of groundwater in the District.
- o Perform aquifer tests and analyze results.

- Determine the total amount of water that flows into the basin through precipitation and surface water imports, and the total amount of water that leaves the basin as exports.
- Establish accurate water budget.
- Project future rates of extraction, and estimate the rate of decline of water levels and possible change or movements of constituents that may impair groundwater quality.
- Compare estimates with real time data, and identify strengths and weaknesses of estimating methods.
- Evaluate plan for groundwater management based on monitoring data. GCID recognizes that monitoring data may reveal the need to require reduction in extractions so that the long-term change in storage does not create overdraft.



#### 4. *Annual Report*

GCID, through its Basin Management Committee, will develop an annual report which shall review the status of groundwater management planning efforts, identify recommended plan modifications and amendments, including an updated work plan and schedule, and provide initial conclusions regarding groundwater planning. GCID will also schedule public involvement meetings to be held at least annually to report progress and receive recommendations.

# **APPENDIX A**

## **Resolution of Intent to Adopt a Groundwater Management Plan**

[APPENDIX A]

RESOLUTION NO. 93-12

RESOLUTION OF INTENT TO ADOPT A GROUNDWATER MANAGEMENT  
PLAN

PREAMBLE,

WHEREAS, Glenn-Colusa Irrigation District (GCID) is a local public agency established in the year 1920, and

WHEREAS, GCID is composed of 152,000 acres of land and said lands require substantial irrigation, totaling over 900,000 acre feet, and

WHEREAS, GCID is responsible for ensuring the residents and businesses in its service area receive the water necessary to sustain their life and livelihood, and

WHEREAS, groundwater is a valuable resource. Its use must be monitored and evaluated, and

WHEREAS, in recognition of the value of groundwater as a resource, California State legislature passed AB 3030, which encourages local public water delivery agencies to develop and implement groundwater management plans, and

WHEREAS, AB 3030 encourages local agencies to engage in conjunctive use so as to assure the efficient use of groundwater, and

WHEREAS, in keeping with this state mandate, and to assure that GCID customers are supplied with their water needs, GCID intends to develop, adopt and implement a groundwater management plan, and

WHEREAS, in keeping with the requirements of AB 3030, GCID adopts a resolution of intent to adopt a groundwater management plan, and



WHEREAS, AB 3030 provides the regulatory scheme for the adoption of a groundwater management plan, GCID comports with the requirements of this scheme by stating the following:

1. GLENN-COLUSA IRRIGATION DISTRICT (GCID) is a local public agency that provides water service to substantial portions of the Glenn and Colusa County area.

2. GCID's service area includes groundwater as identified in the Department of Water Resources Bulletin No. 118.

3. The groundwater basin in GCID's water service area is not currently subject to a groundwater management plan pursuant to any laws, ordinances, court orders, judgments, or decrees, nor is it currently subject to the authority of a water master.

4. Under the provisions of AB 3030 GCID is authorized to develop and implement a plan to manage the groundwater in its service area.

5. The definitions relevant to the adoption of this groundwater management plan are as follows:

GROUNDWATER BASIN: is any basin identified in the Department of Water Resources Bulletin No. 118, dated September 1975.

GROUNDWATER means all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water which flows in known and definite channels.

GROUNDWATER MANAGEMENT PLAN means coordinated and ongoing activity undertaken for the benefit of a groundwater basin, or portion of groundwater basin.

6. The purpose of GCID's groundwater management plan is to manage the groundwater in their service area.

7. This plan will include, but is not limited to the following activities:

- a. The administration of a well abandonment and well destruction program.
- b. Replenishment of groundwater extracted by water producers.
- c. Monitoring of groundwater levels, storage and quality.
- d. Facilitating conjunctive use operations.
- e. Identification of well construction policies.
- f. The construction and operation by the local agency of groundwater recharge, storage and extraction projects.
- g. The development of relationships with other local, state and federal regulatory agencies.

8. In developing and implementing this plan GCID will take into account its impact on business activities and specifically its impact on agricultural activities.

9. In compliance with AB 3030 GCID will meet at least once per year to coordinate its groundwater management plan.

10. All provisions of GCID's groundwater management plan will be in compliance with the requirements of AB 3030.

PASSED AND ADOPTED by unanimous vote of the board on the 3rd day of June, 1993.

# **APPENDIX B**

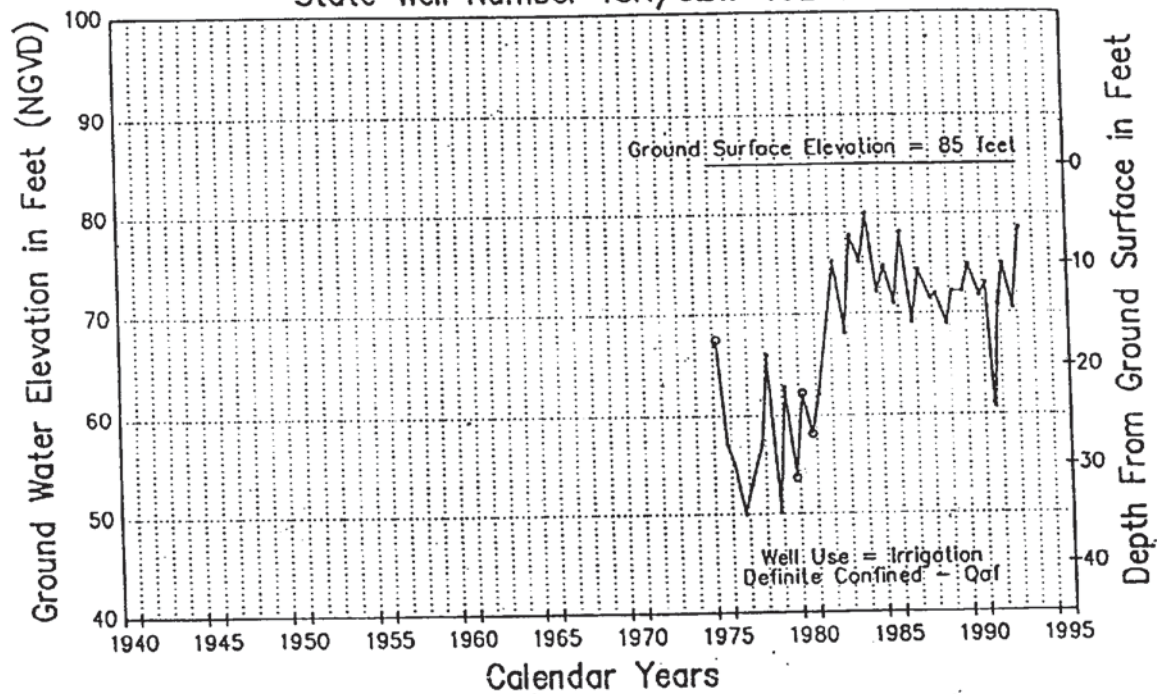
## **Hydrographs of Wells Monitored by DWR within GCID Boundaries**



**COLUSA COUNTY GROUND WATER  
HYDROGRAPHS**

# Sacramento Valley Ground Water Basin Colusa County

State Well Number 15N/02W-19E01M

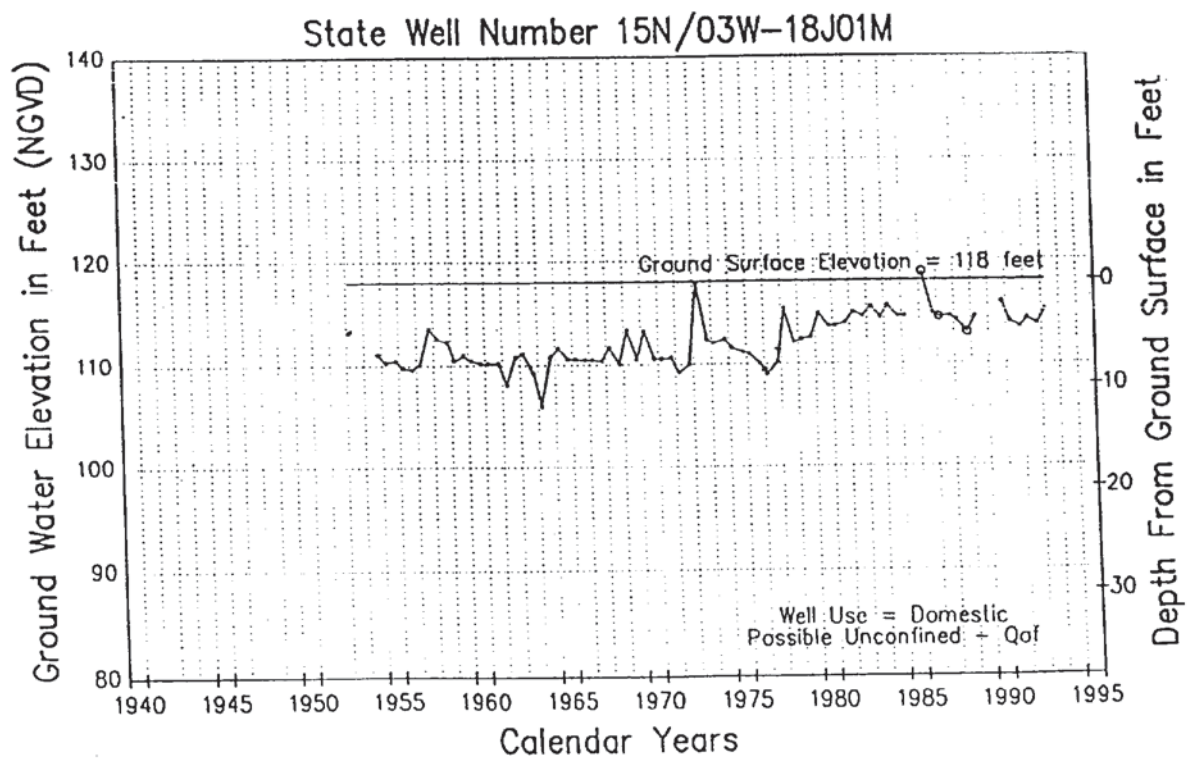
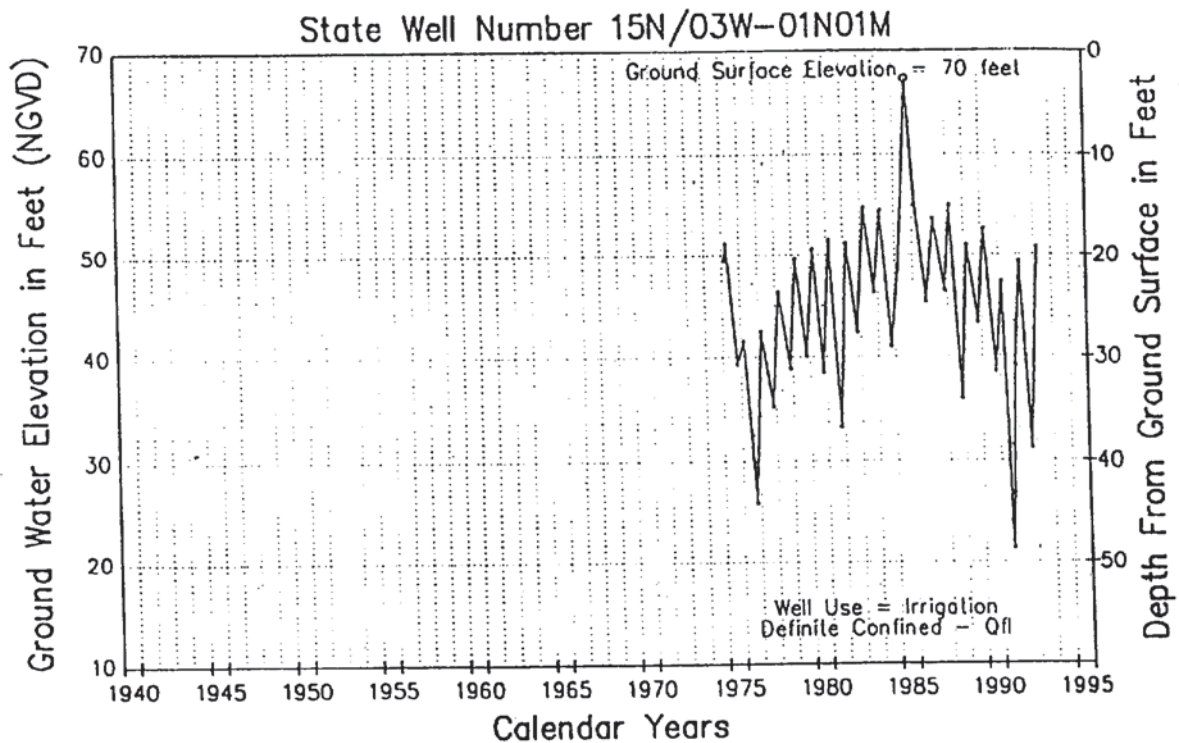


• Water surface elevation in well

◦ Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Ground Water Basin Colusa County



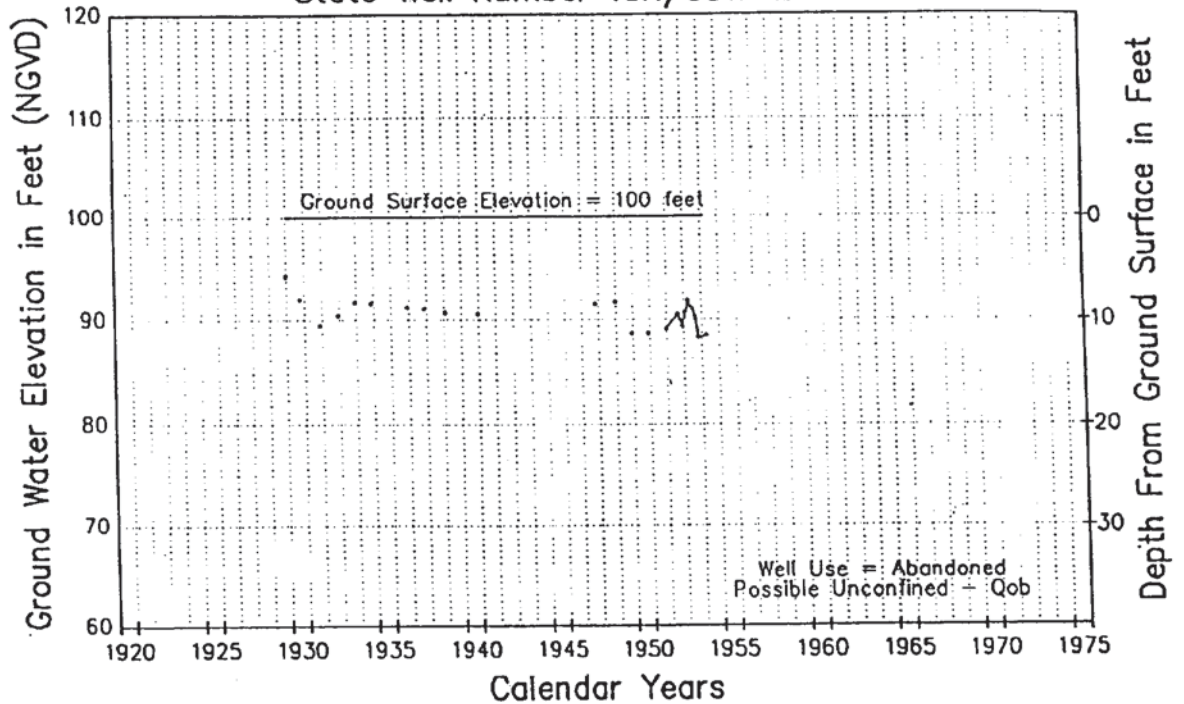
• Water surface elevation in well

◦ Questionable measurement

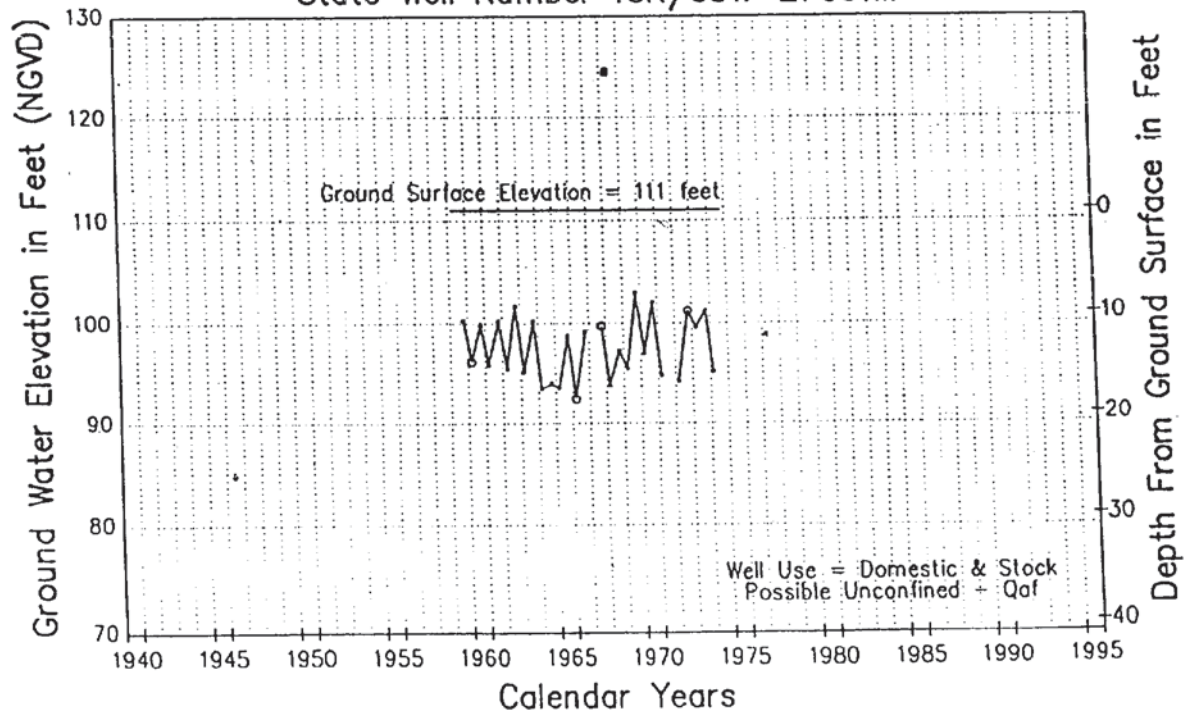
Department of Water Resources, Northern District

# Sacramento Valley Ground Water Basin Colusa County

State Well Number 15N/03W-24E01M



State Well Number 15N/03W-27G01M

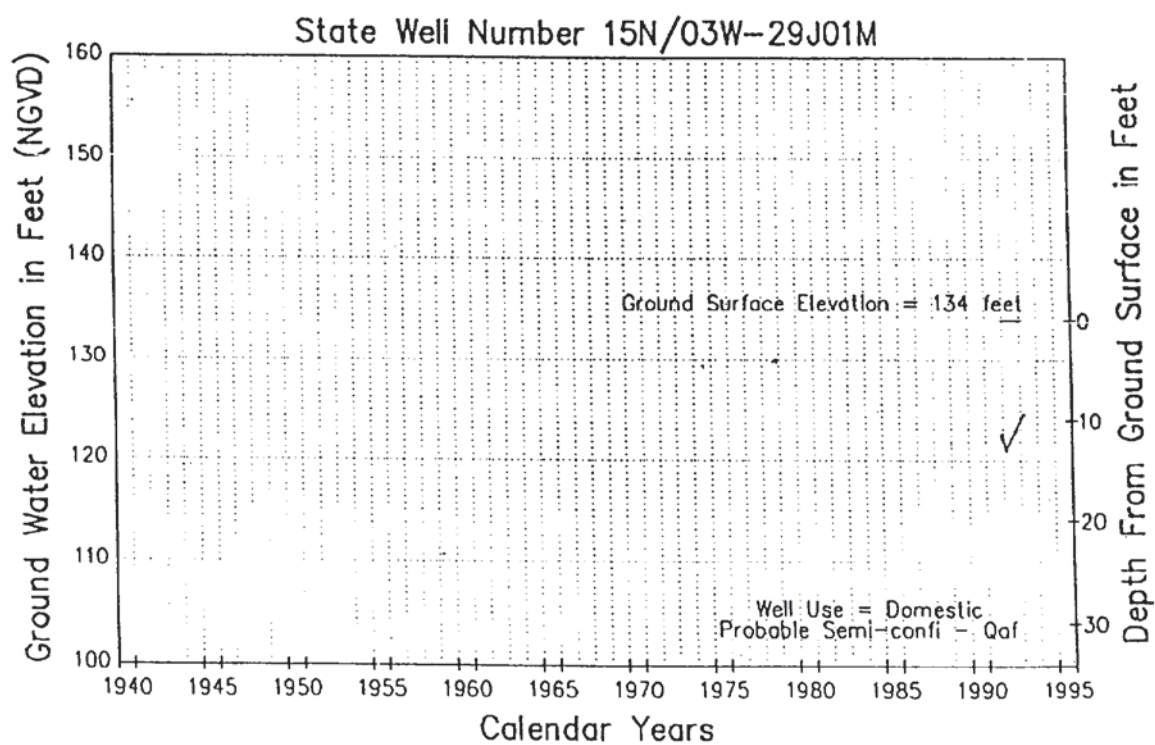
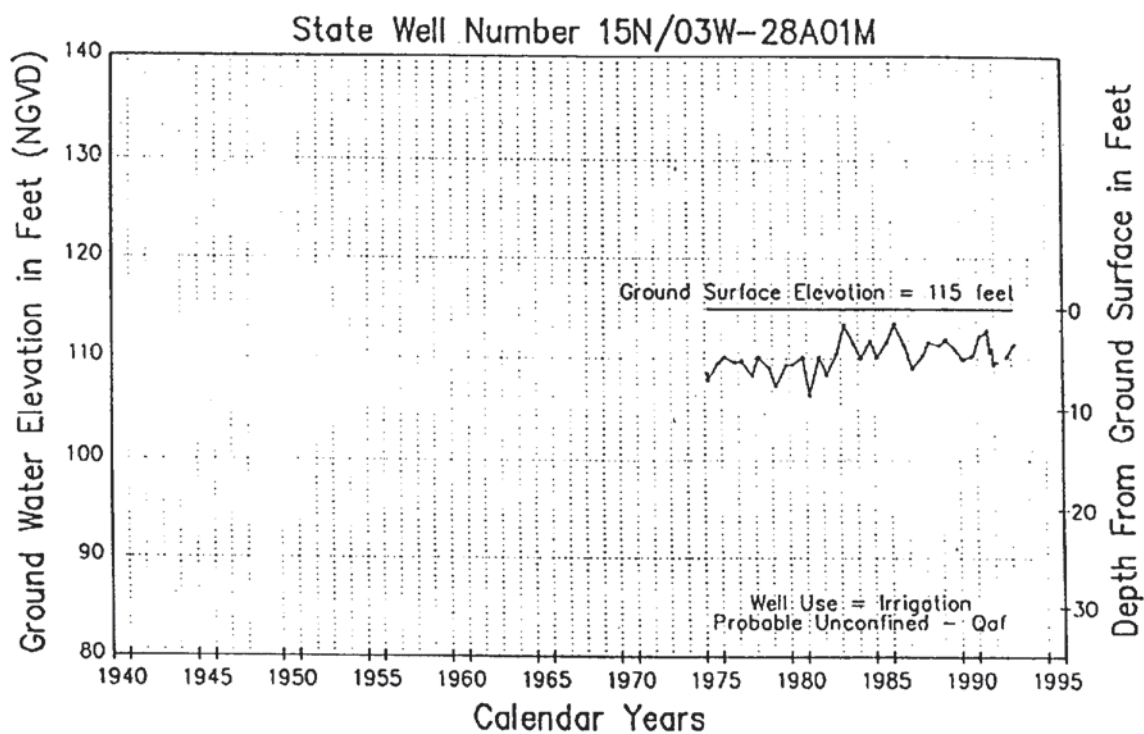


• Water surface elevation in well      ◦ Questionable measurement

Department of Water Resources, Northern District



# Sacramento Valley Ground Water Basin Colusa County

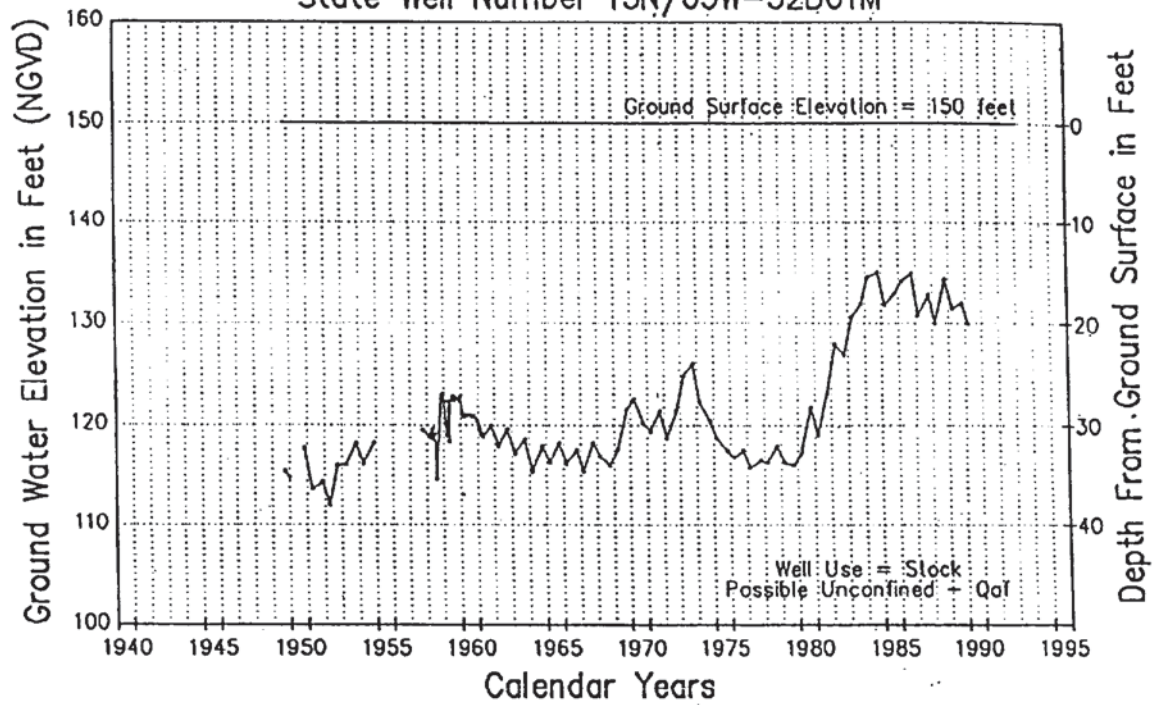


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Department of Water Resources, Northern District

# Sacramento Valley Ground Water Basin Colusa County

State Well Number 15N/03W-32B01M



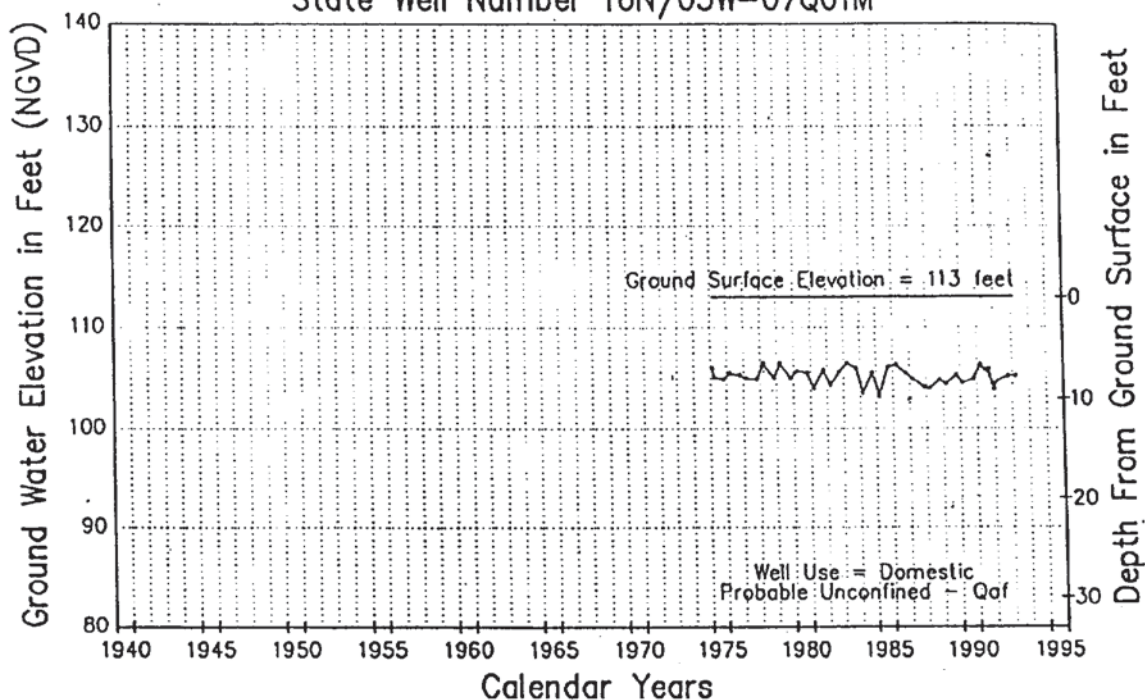
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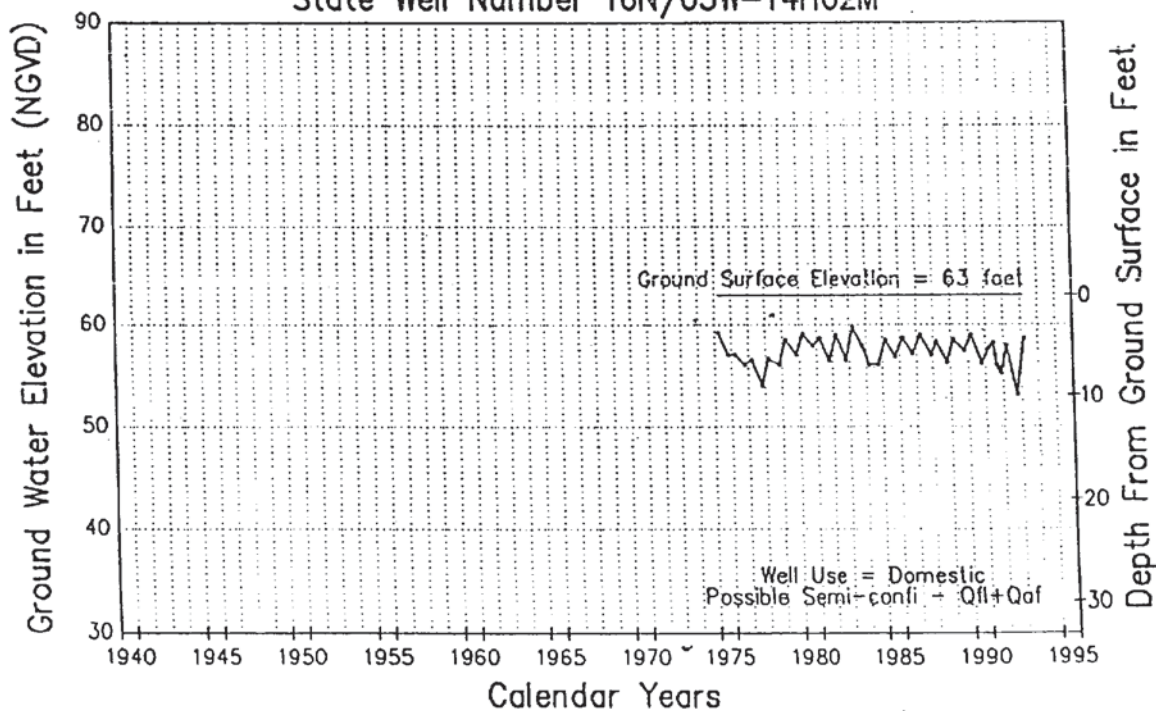
Department of Water Resources, Northern District

# Sacramento Valley Ground Water Basin Colusa County

State Well Number 16N/03W-07Q01M



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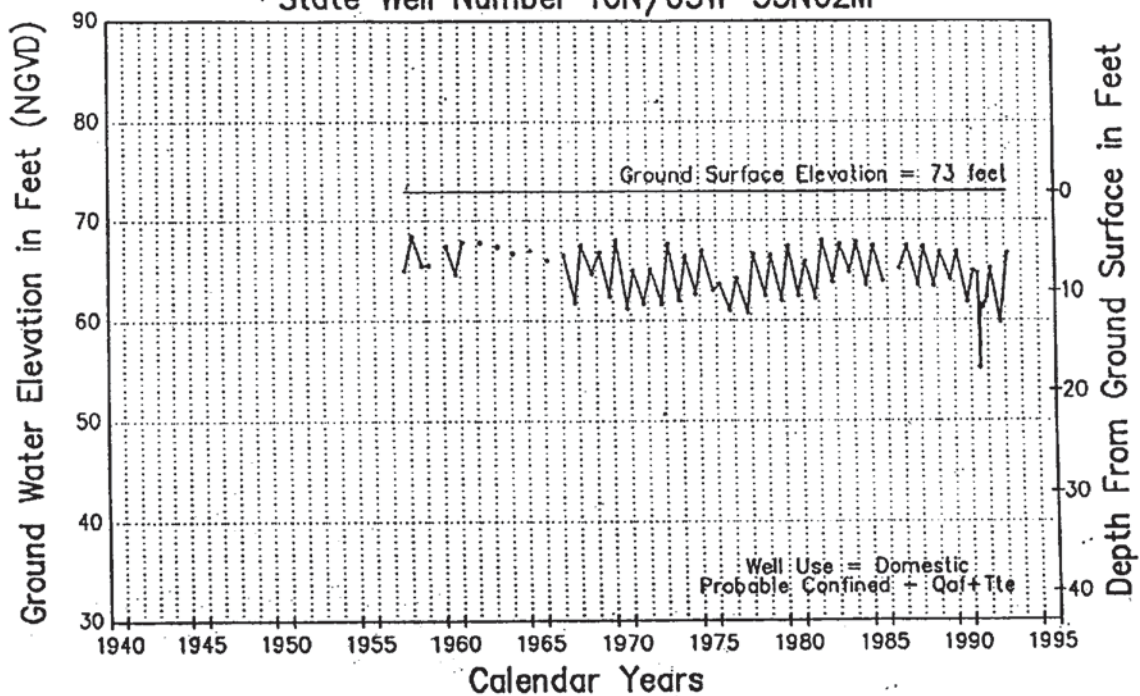
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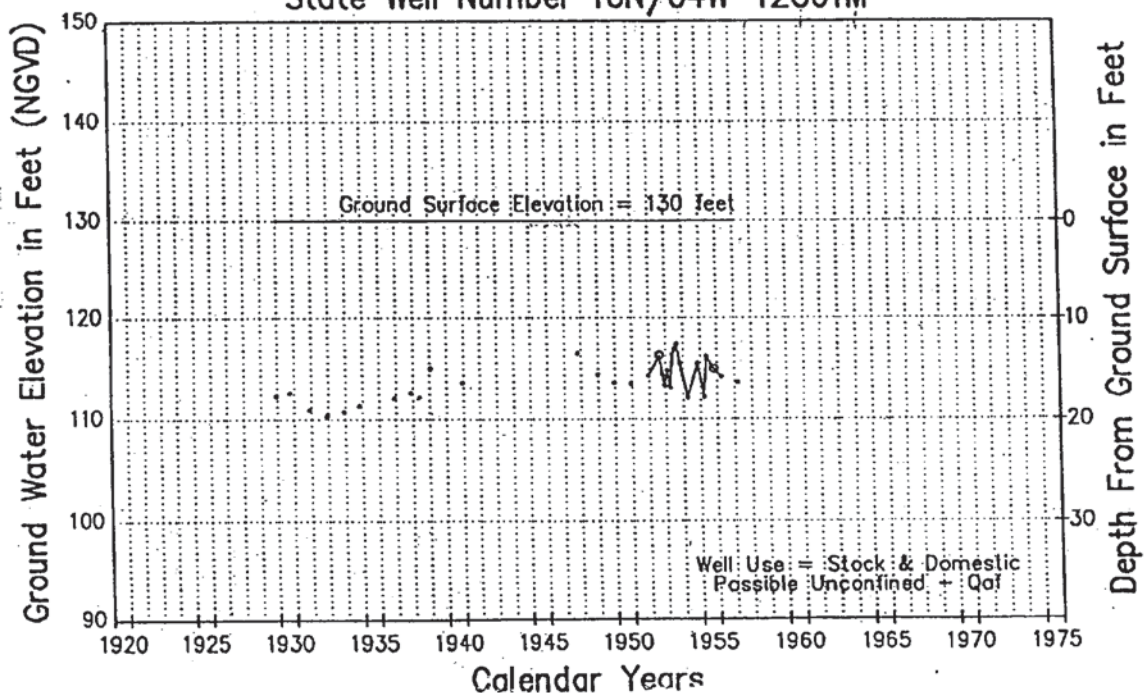


# Sacramento Valley Ground Water Basin Colusa County

State Well Number 16N/03W-35N02M



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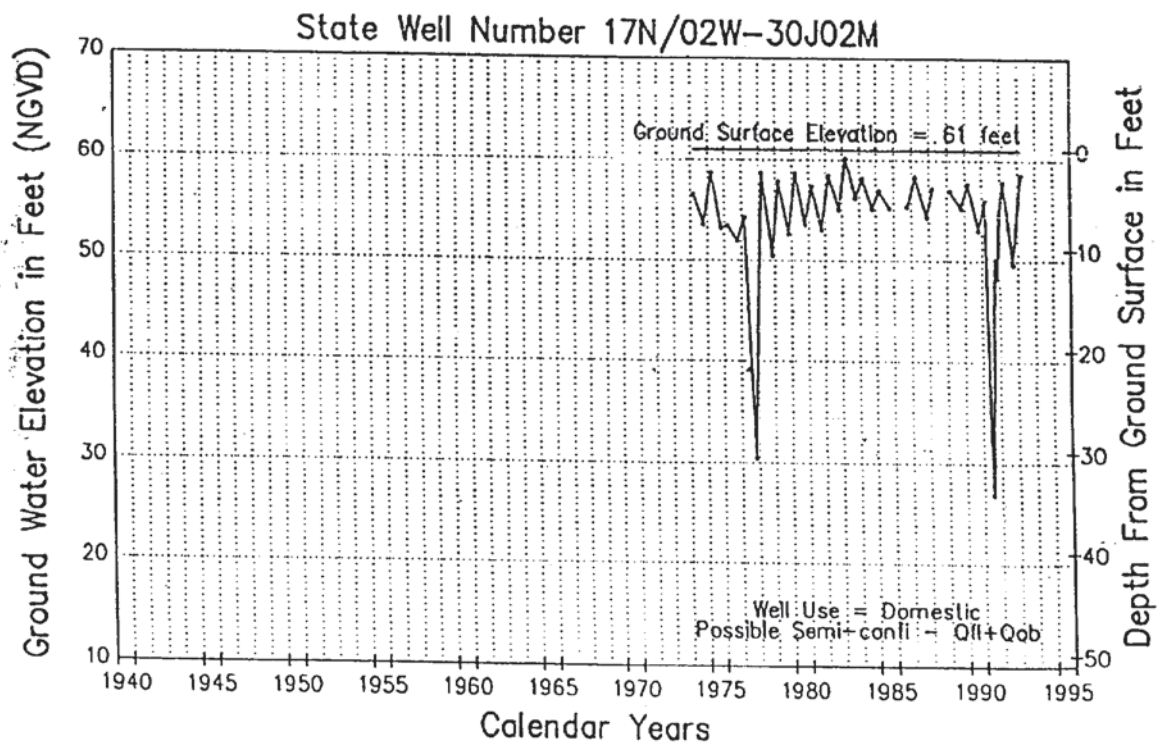
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Department of Water Resources, Northern District



# Sacramento Valley Ground Water Basin Colusa County

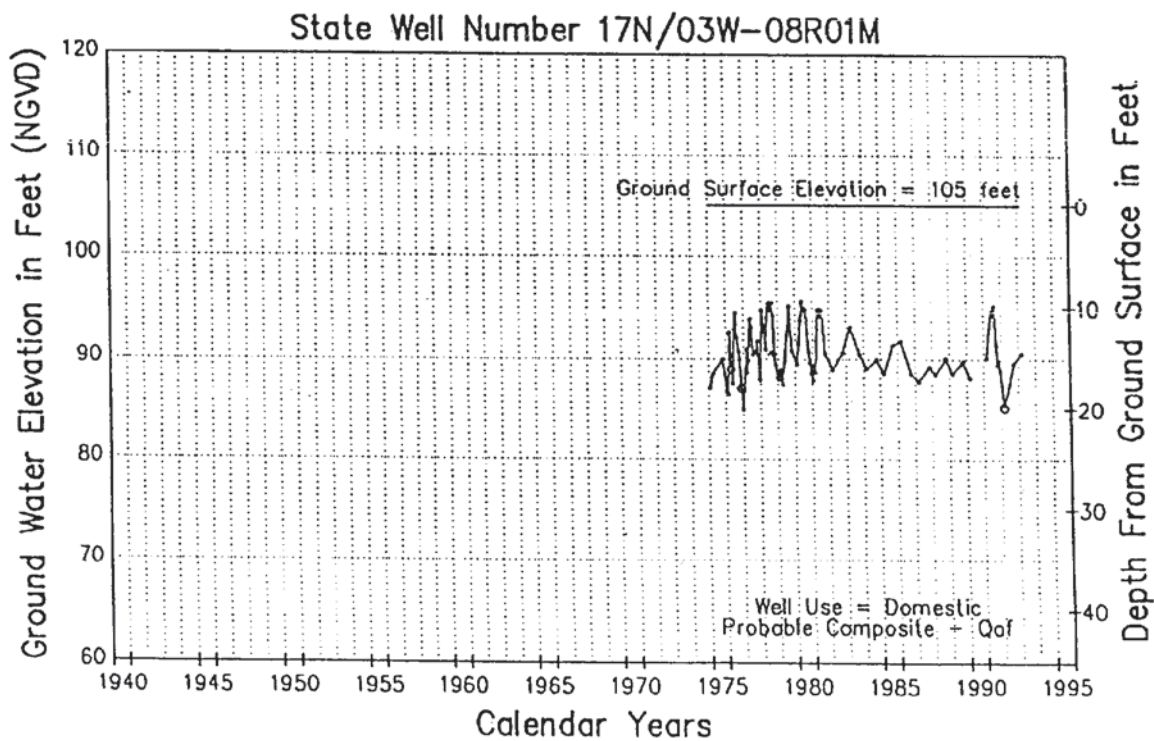
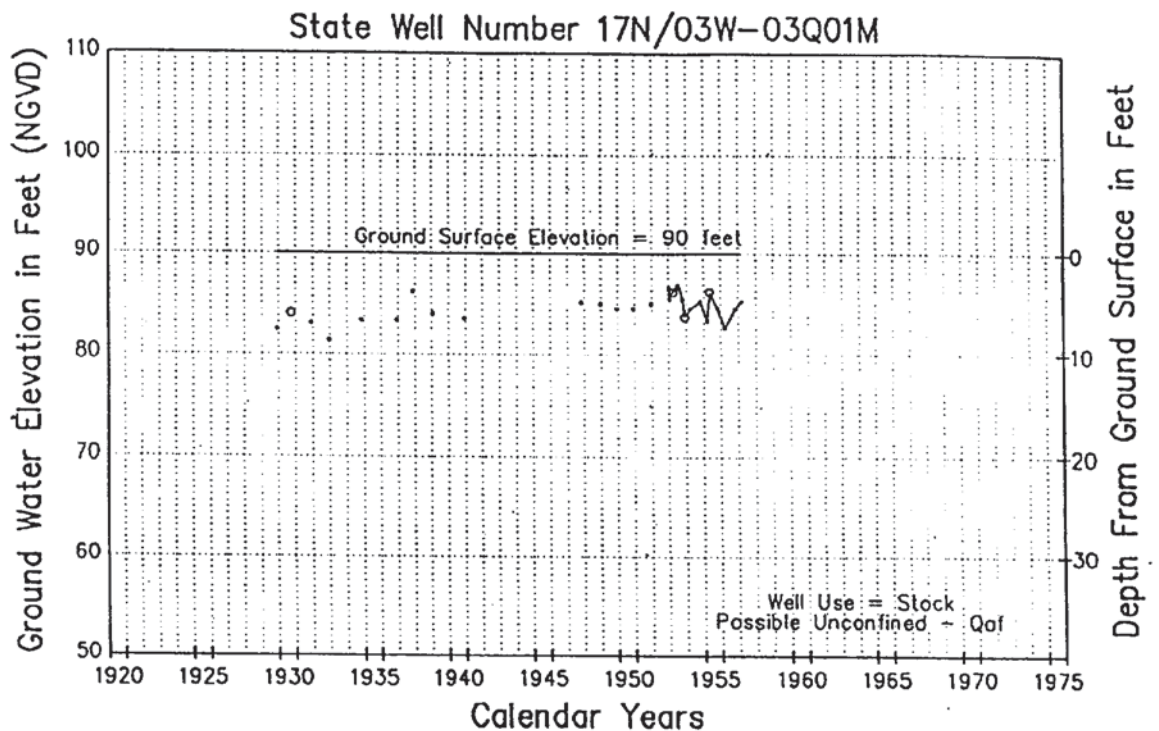


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Department of Water Resources, Northern District

# Sacramento Valley Ground Water Basin Colusa County

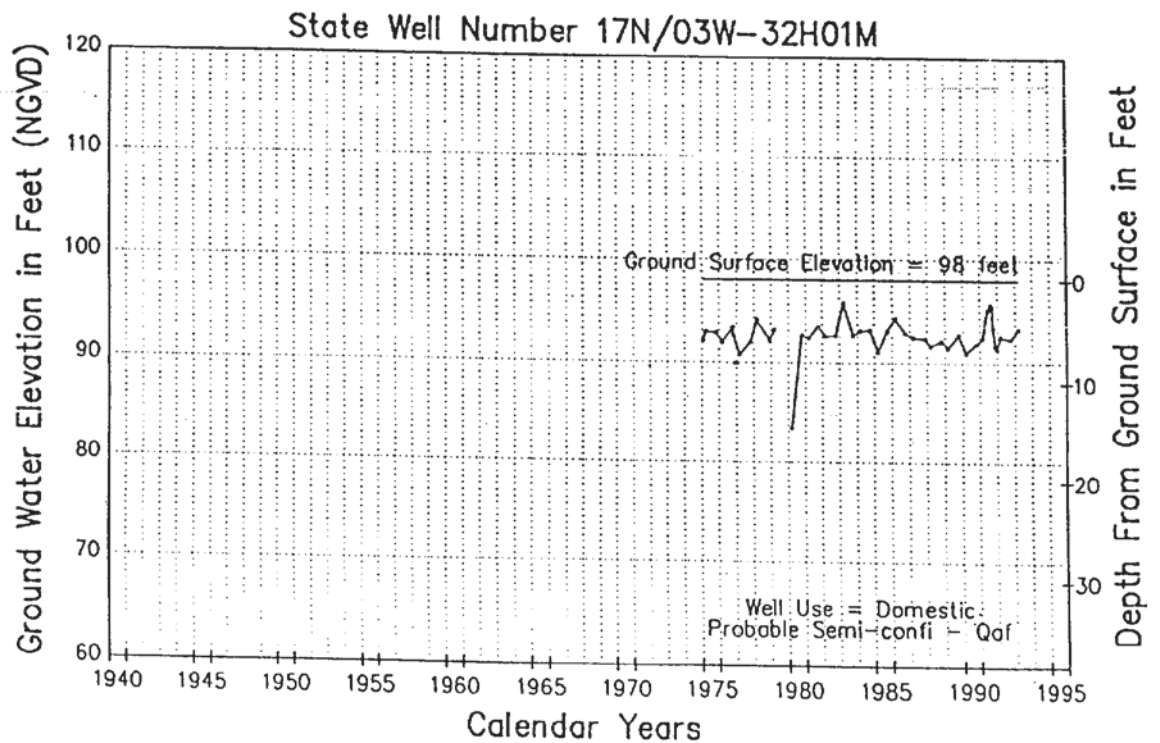
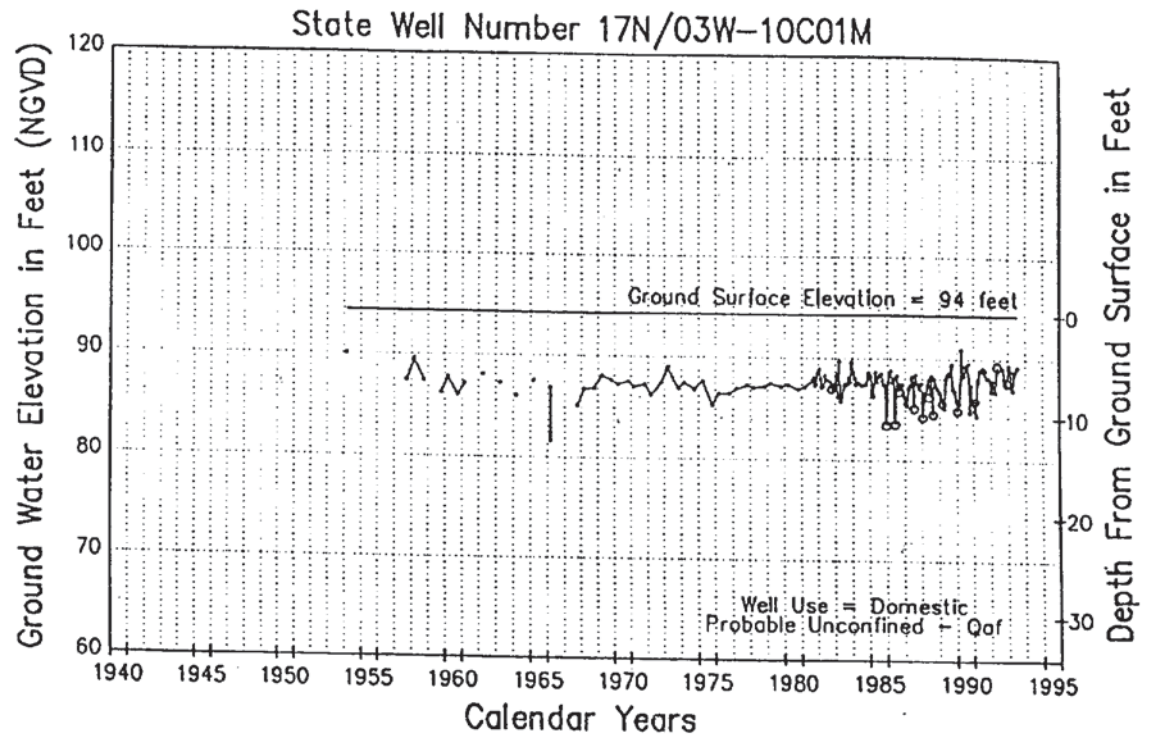


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Department of Water Resources, Northern District

# Sacramento Valley Ground Water Basin Colusa County



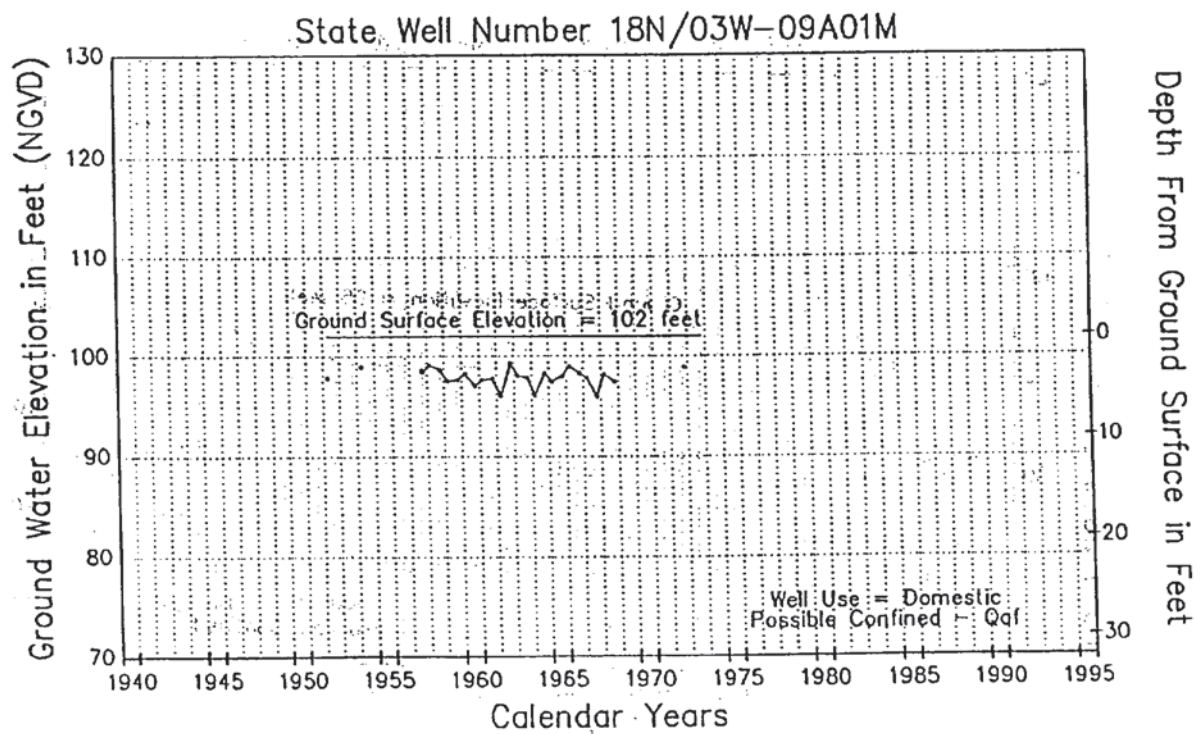
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Department of Water Resources, Northern District

# **GLENN COUNTY GROUND WATER HYDROGRAPHS**



# Sacramento Valley Basin – Glenn County

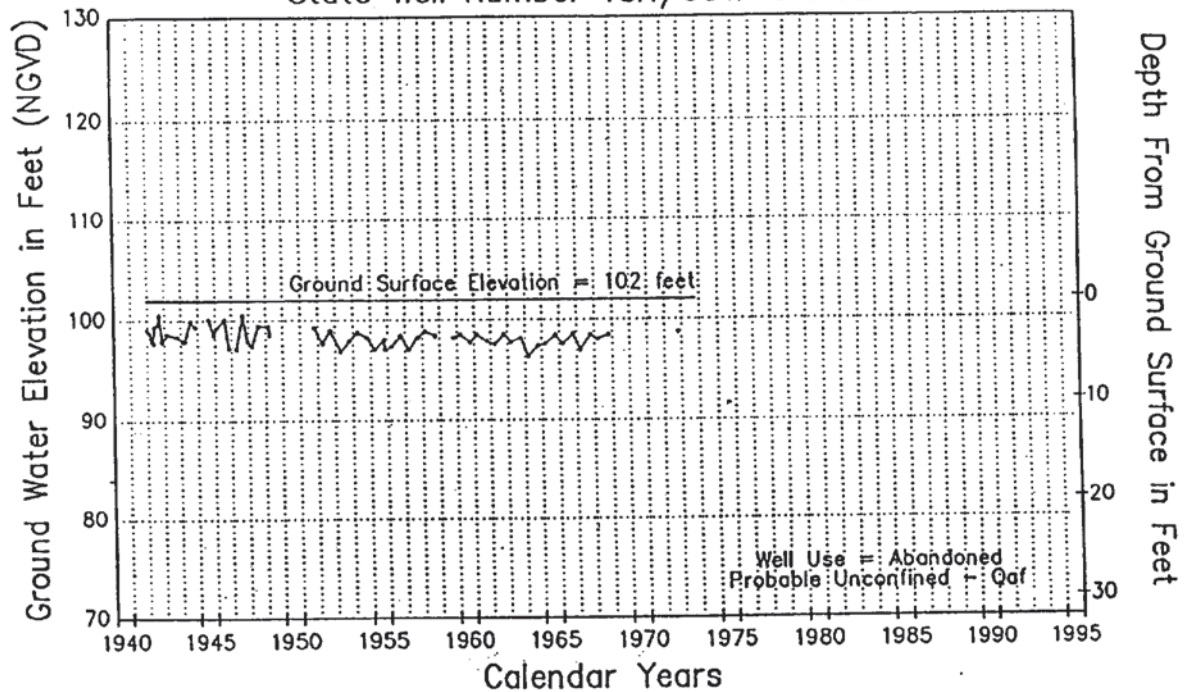


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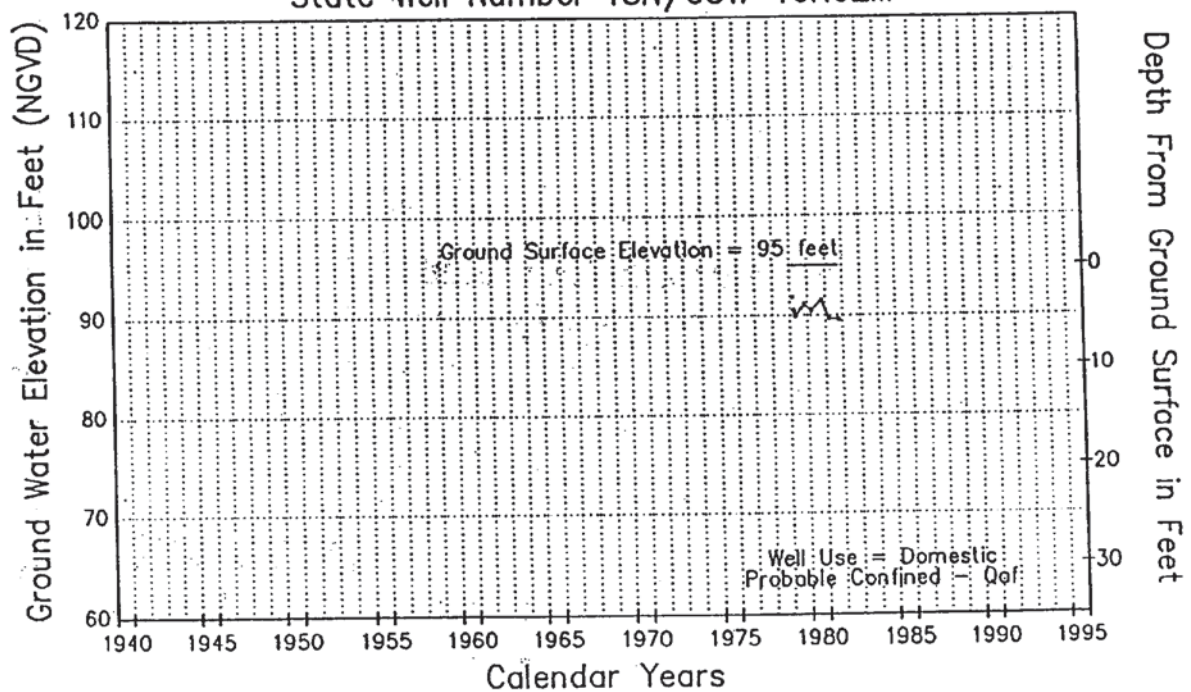
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

State Well Number 18N/03W-09A02M



State Well Number 18N/03W-10K02M

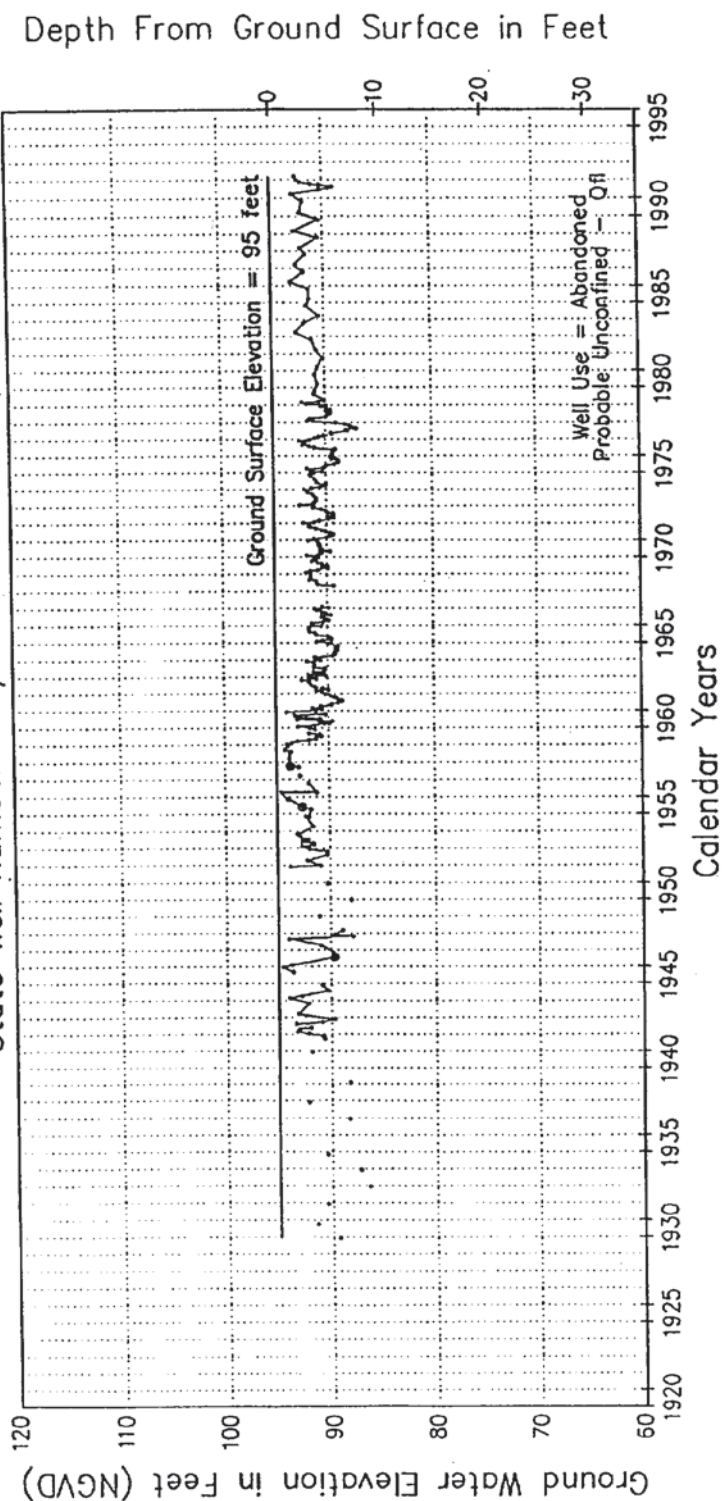


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Department of Water Resources, Northern District

# Sacramento Valley Basin — Glenn County

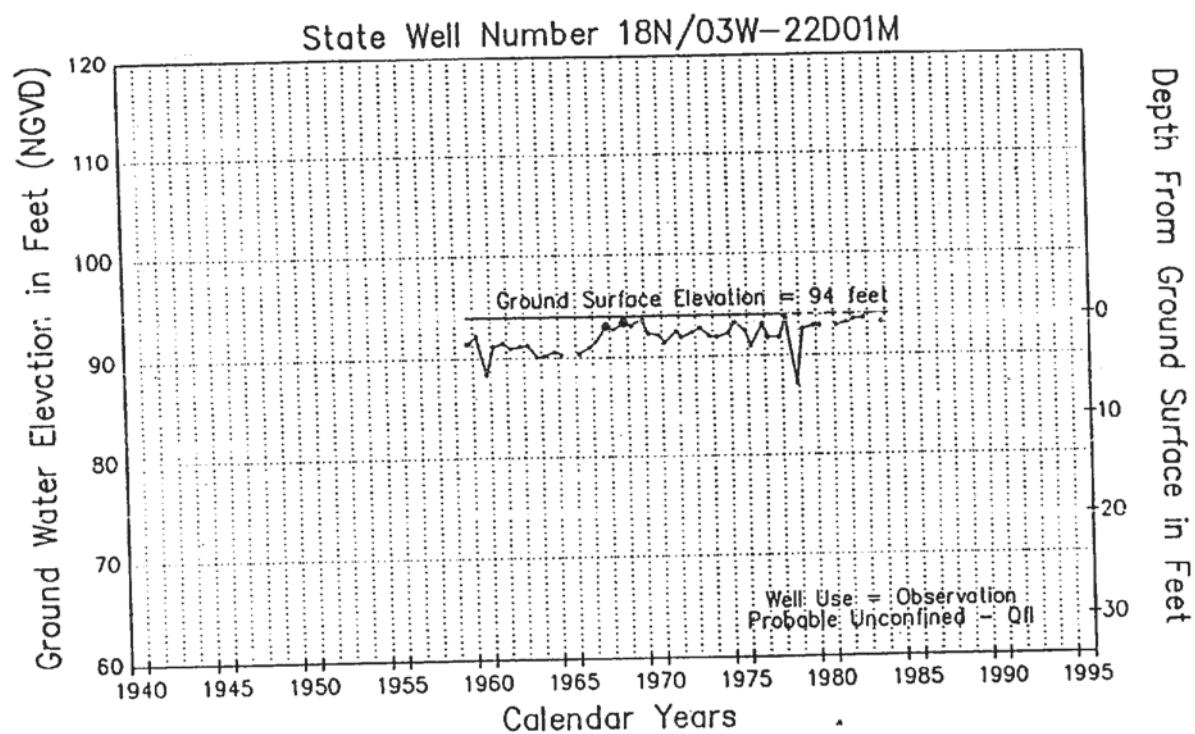
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Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

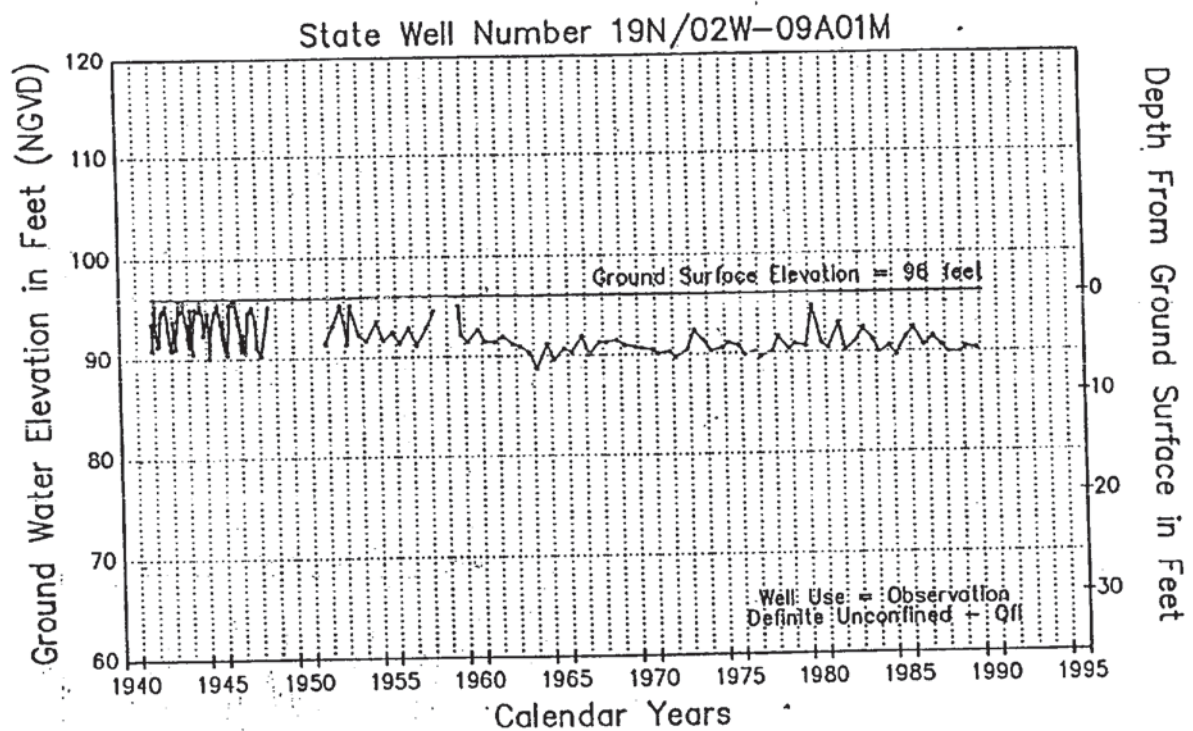


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Department of Water Resources, Northern District



# Sacramento Valley Basin - Glenn County



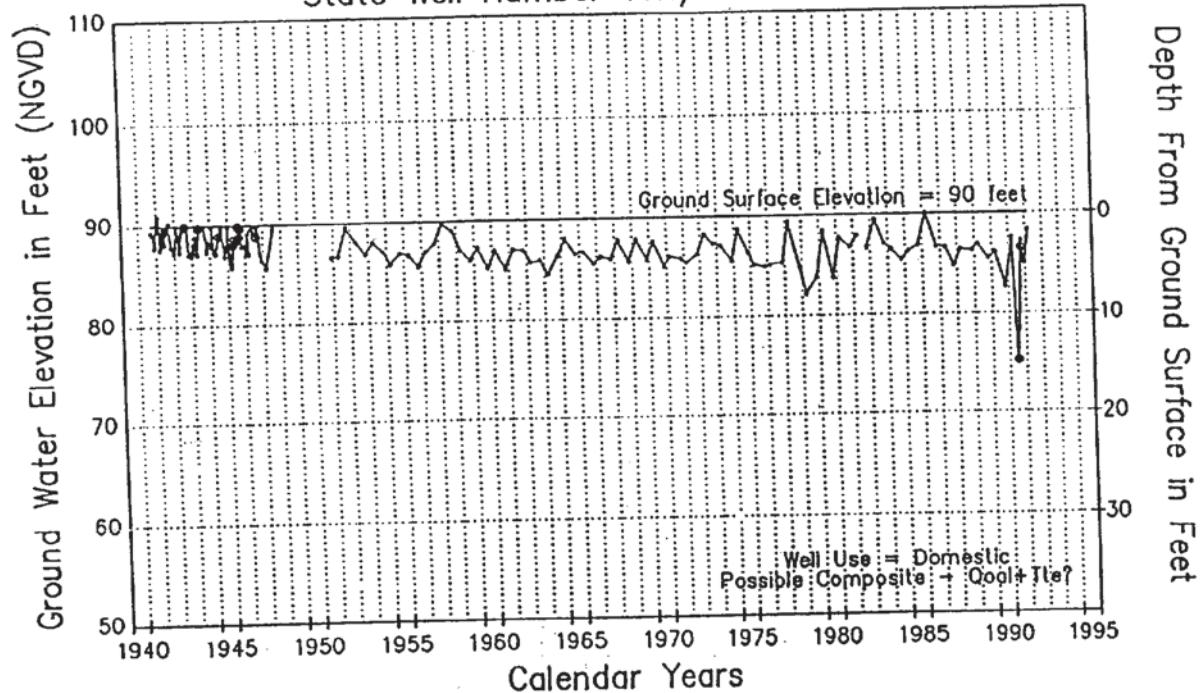
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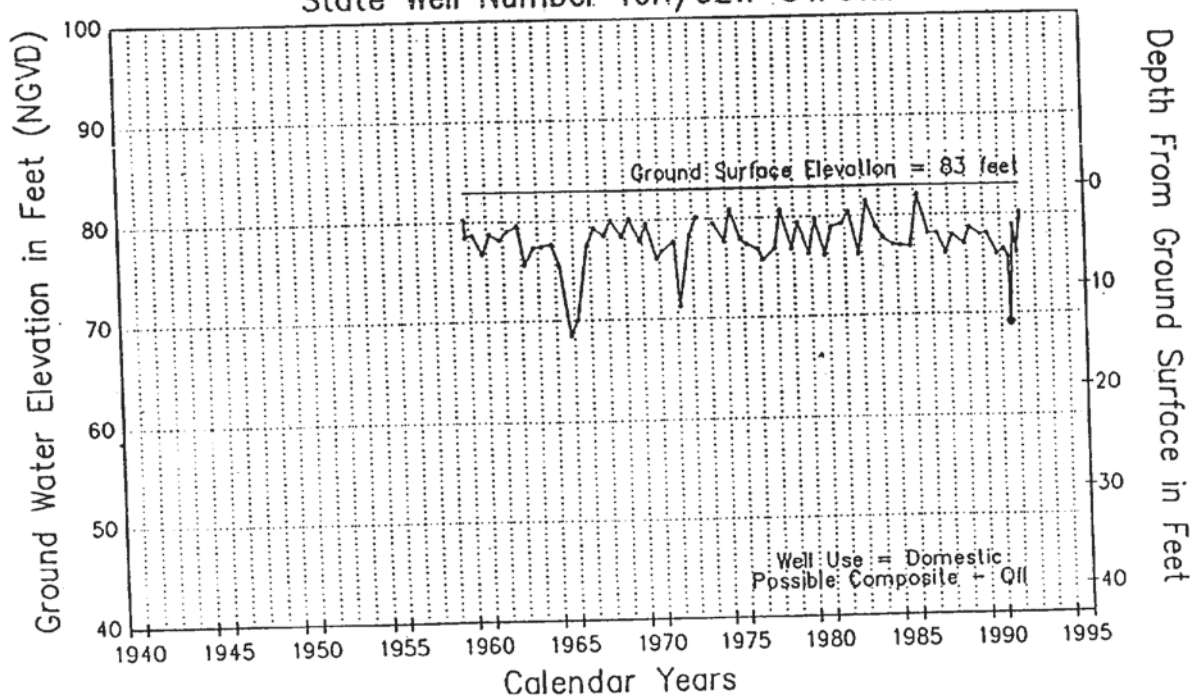
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

State Well Number 19N/02W-29Q01M



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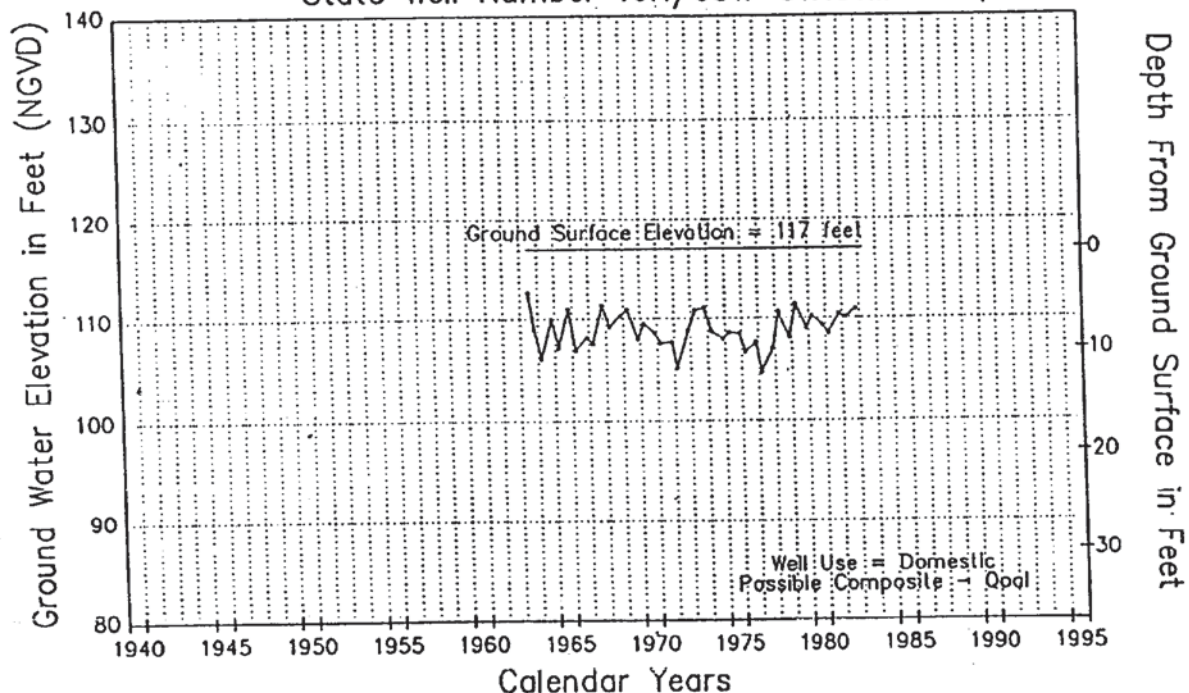


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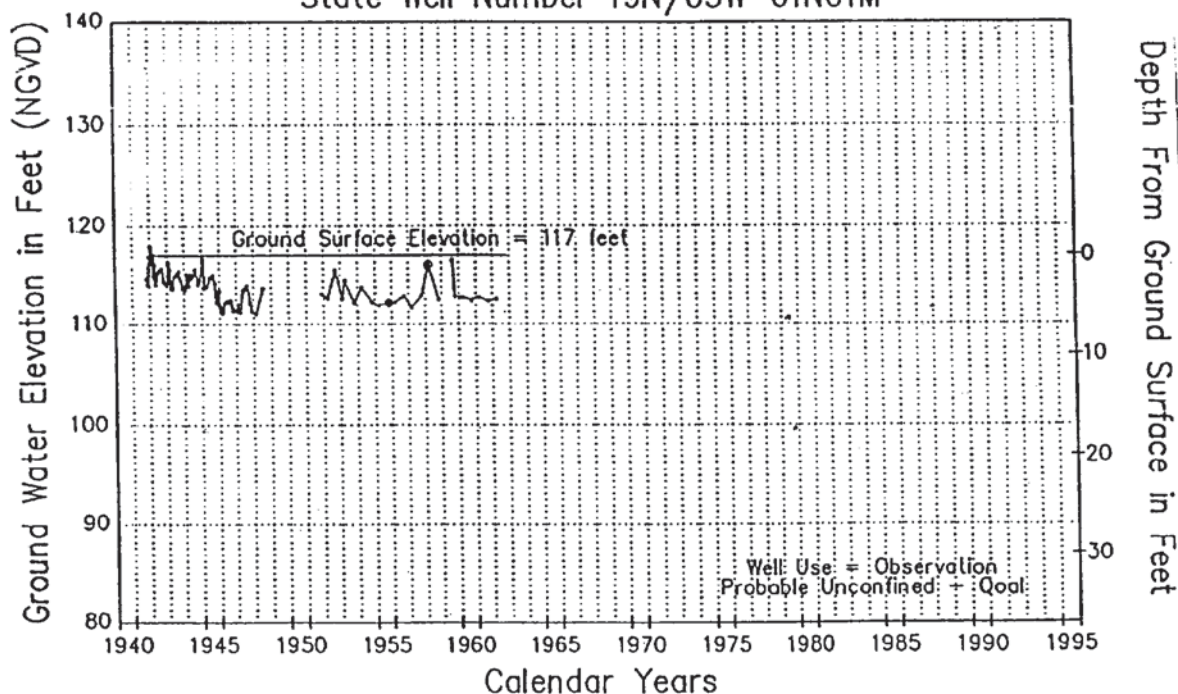
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

State Well Number 19N/03W-01H01M



State Well Number 19N/03W-01N01M



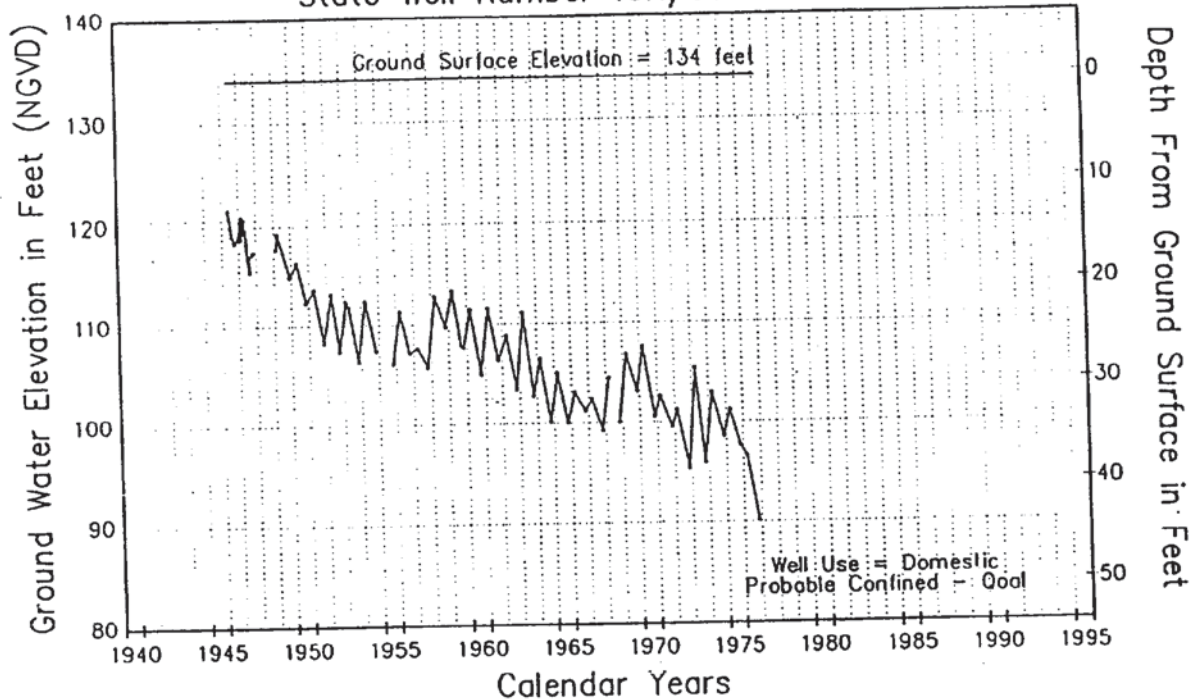
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Department of Water Resources, Northern District

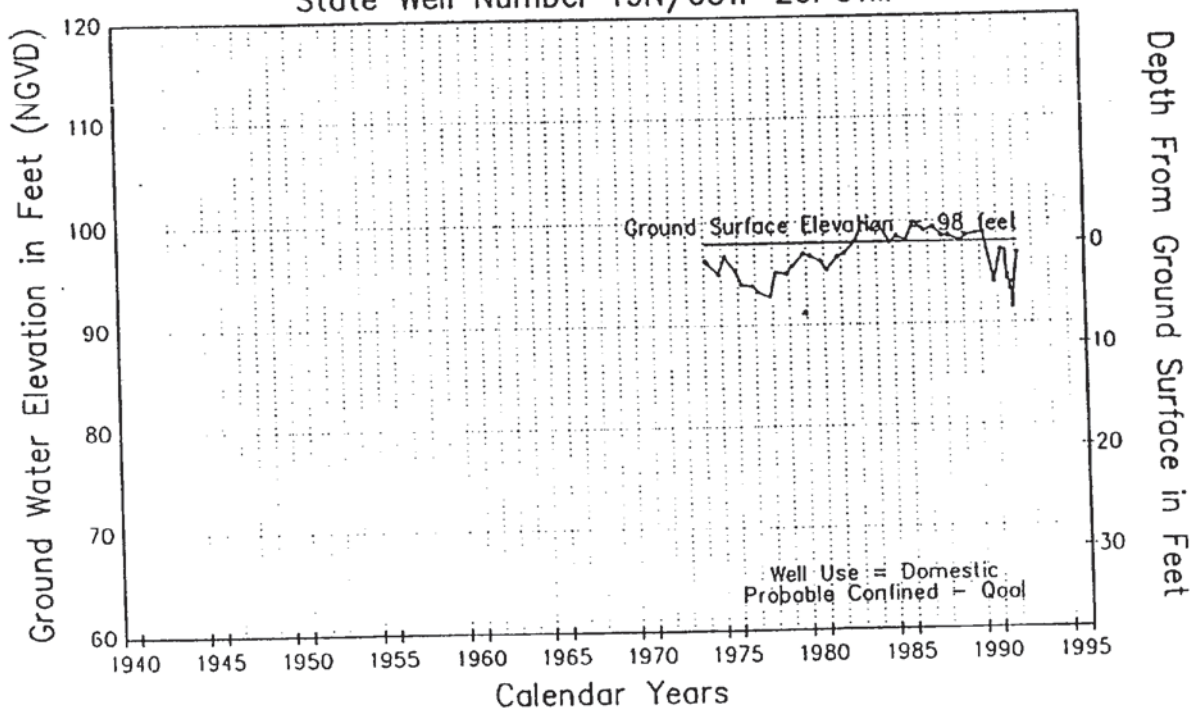


# Sacramento Valley Basin – Glenn County

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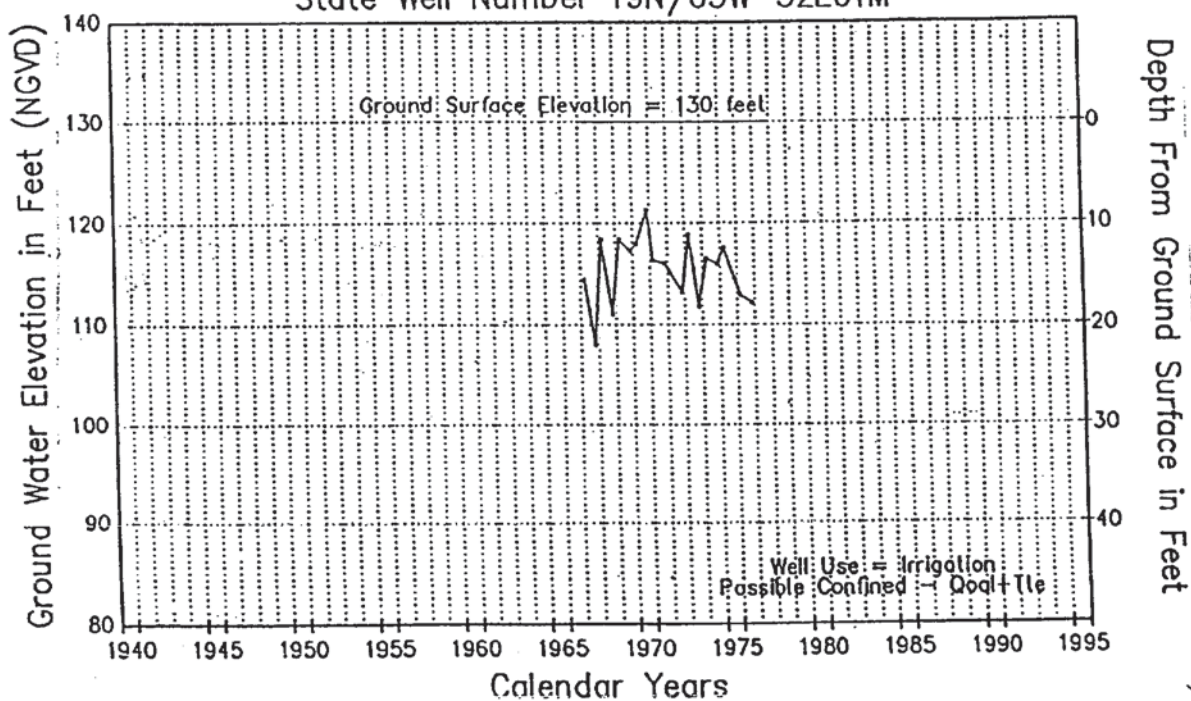
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Department of Water Resources, Northern District

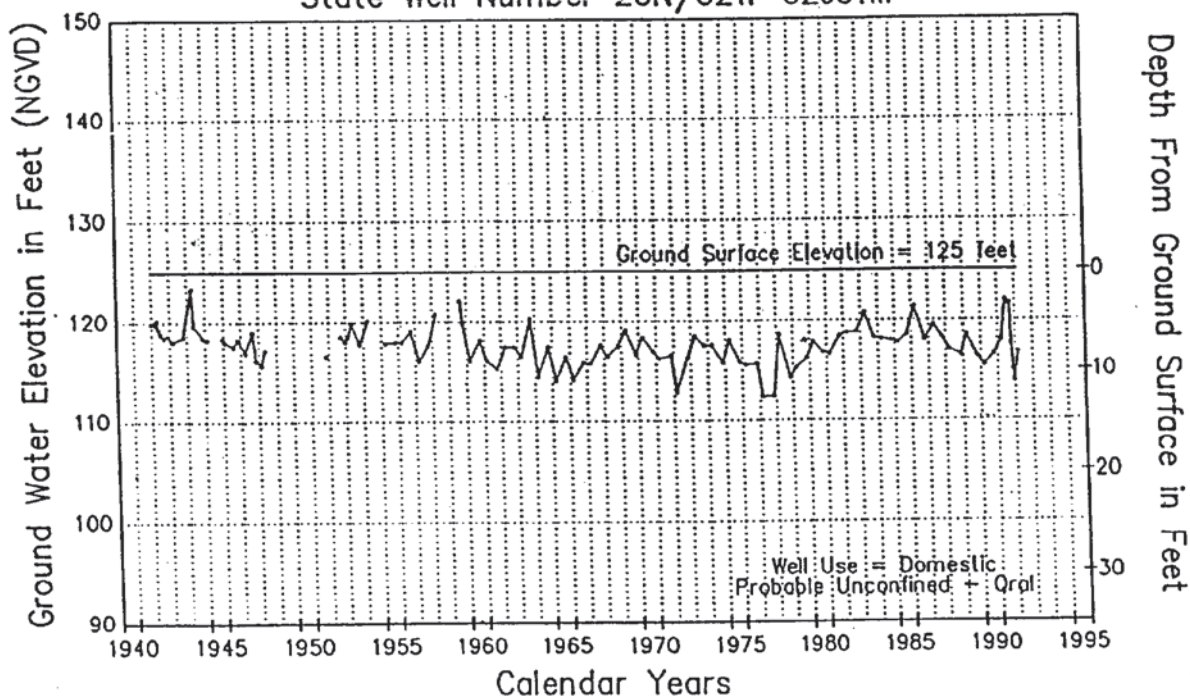


# Sacramento Valley Basin – Glenn County

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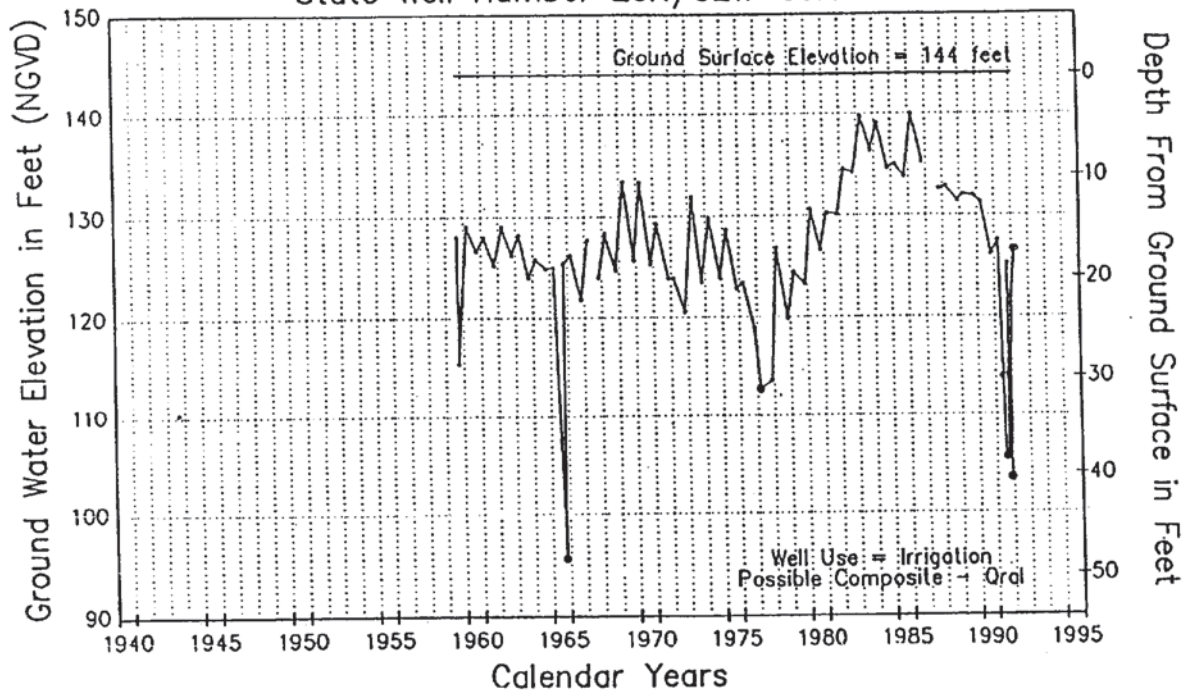


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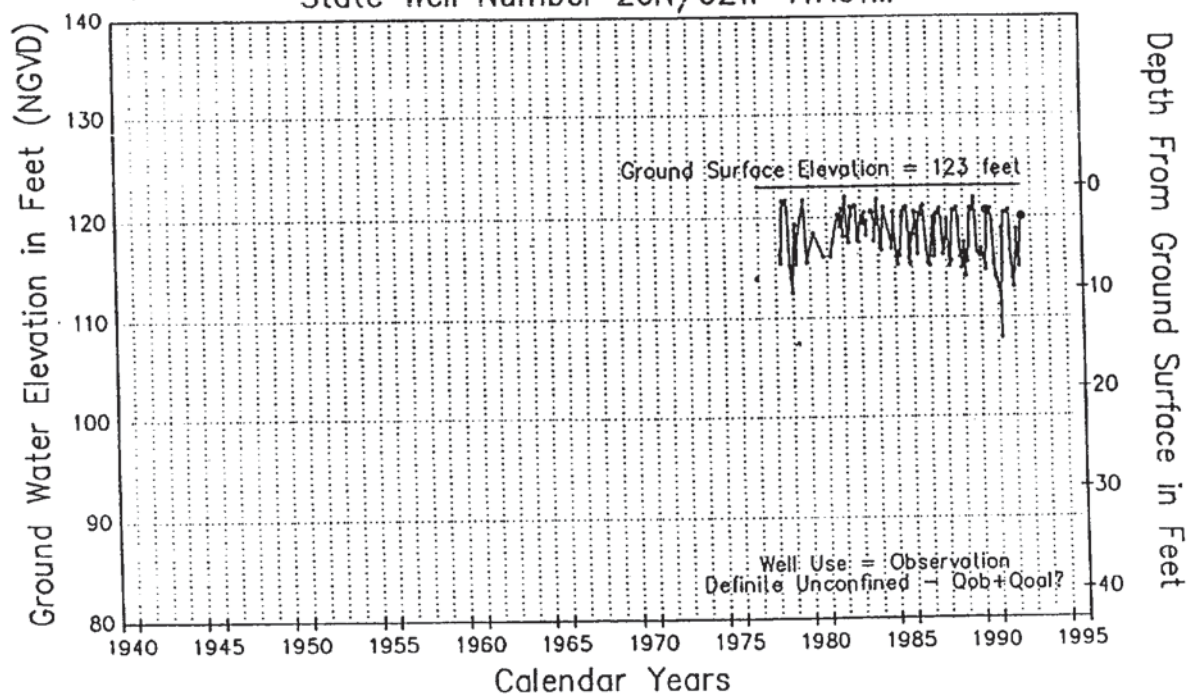
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

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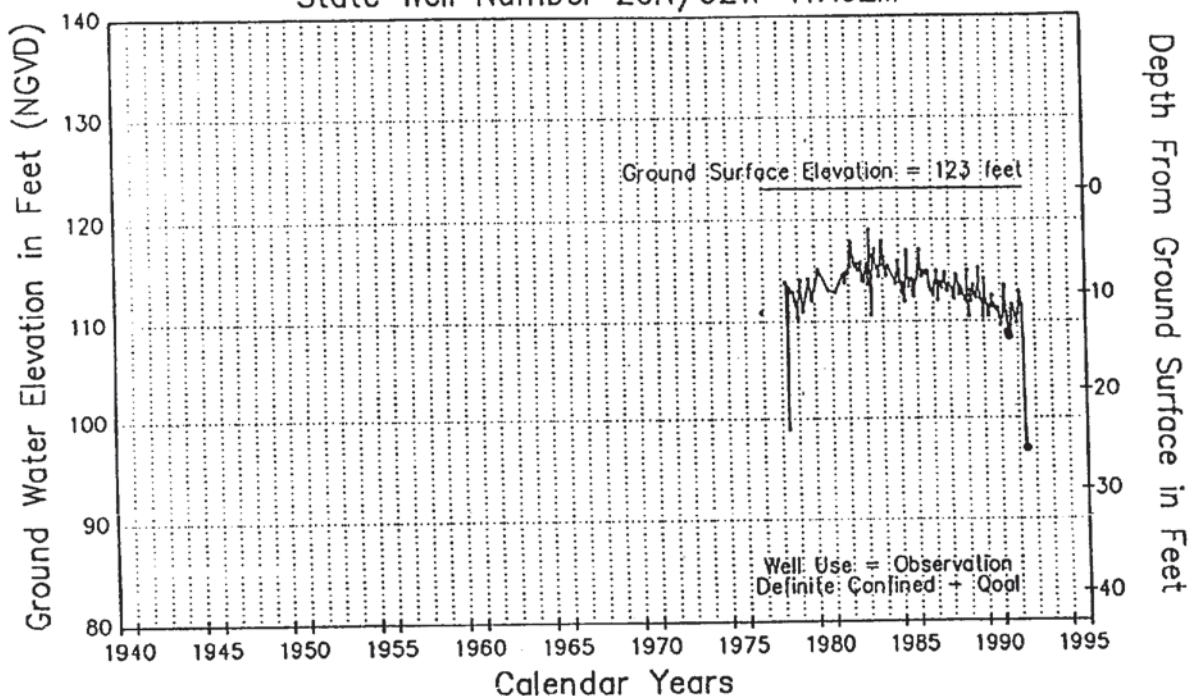
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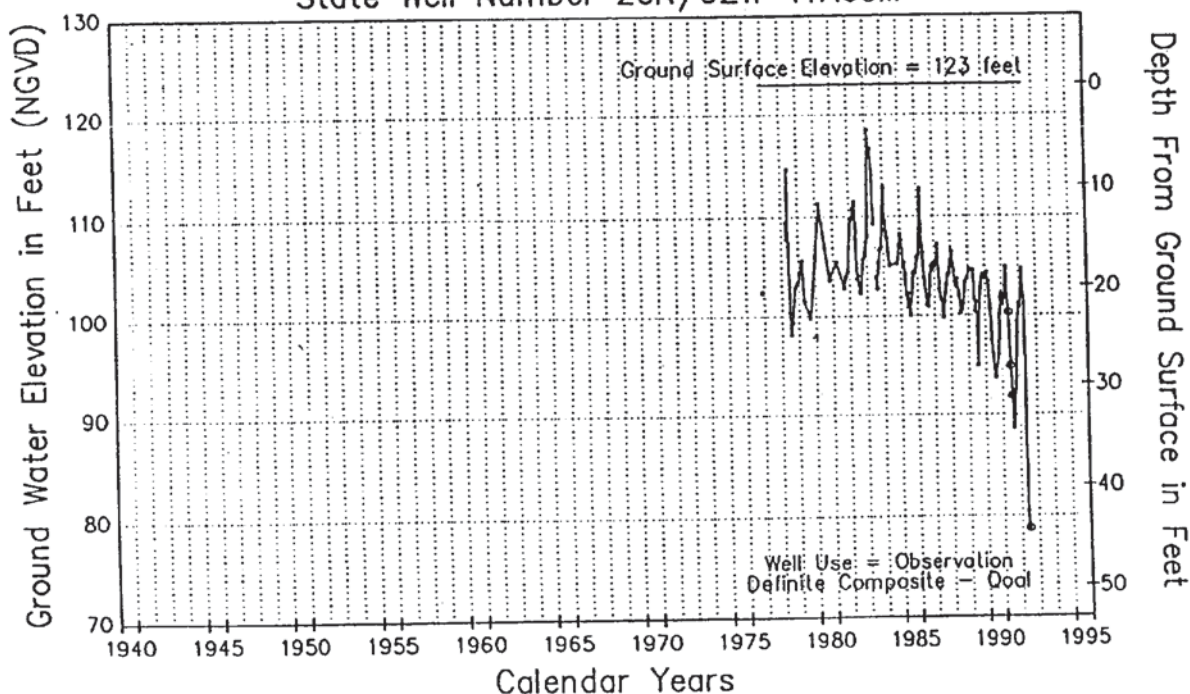


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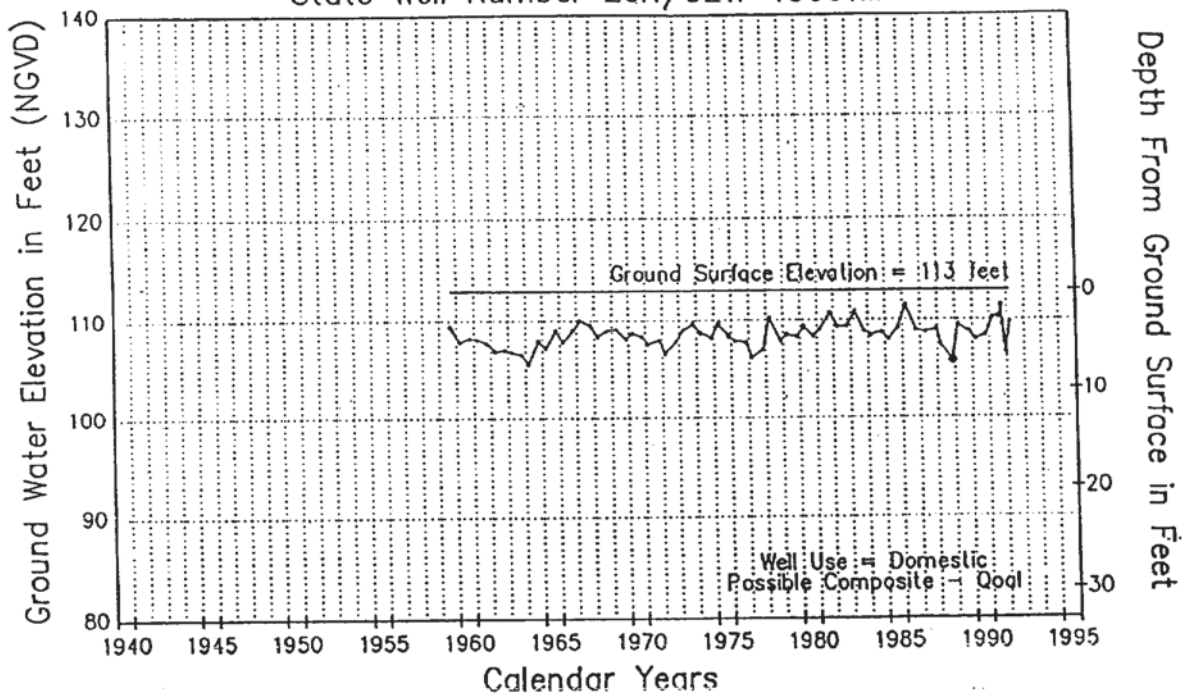


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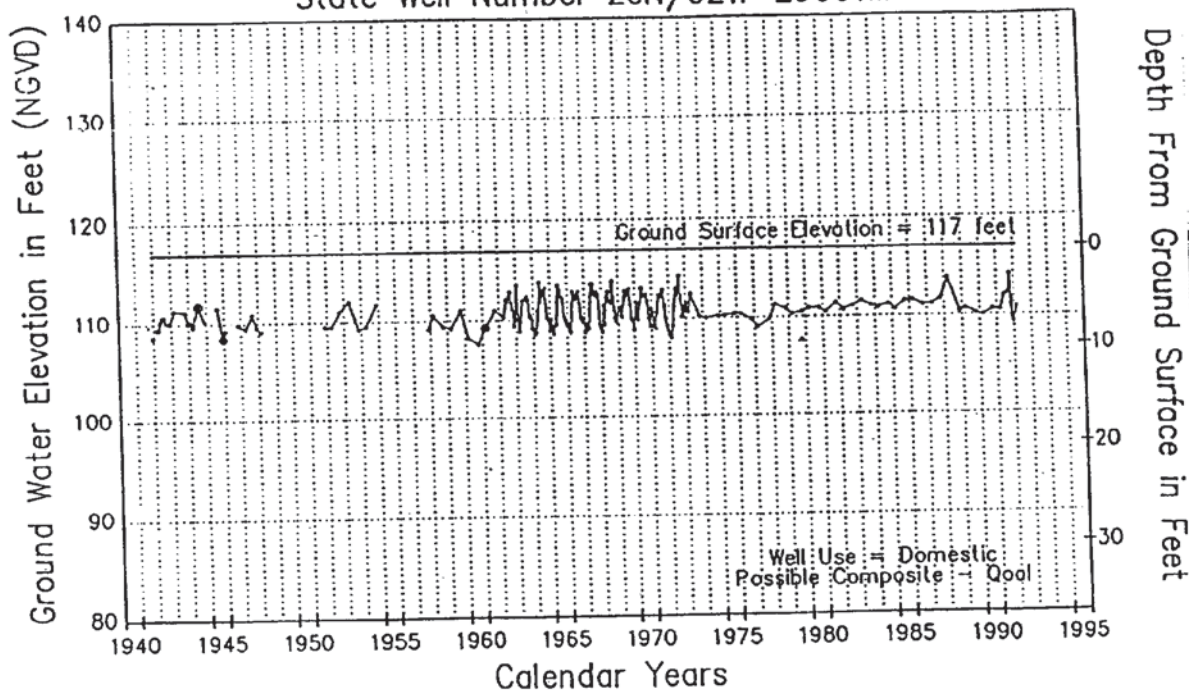
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

State Well Number 20N/02W-13G01M



State Well Number 20N/02W-29G01M



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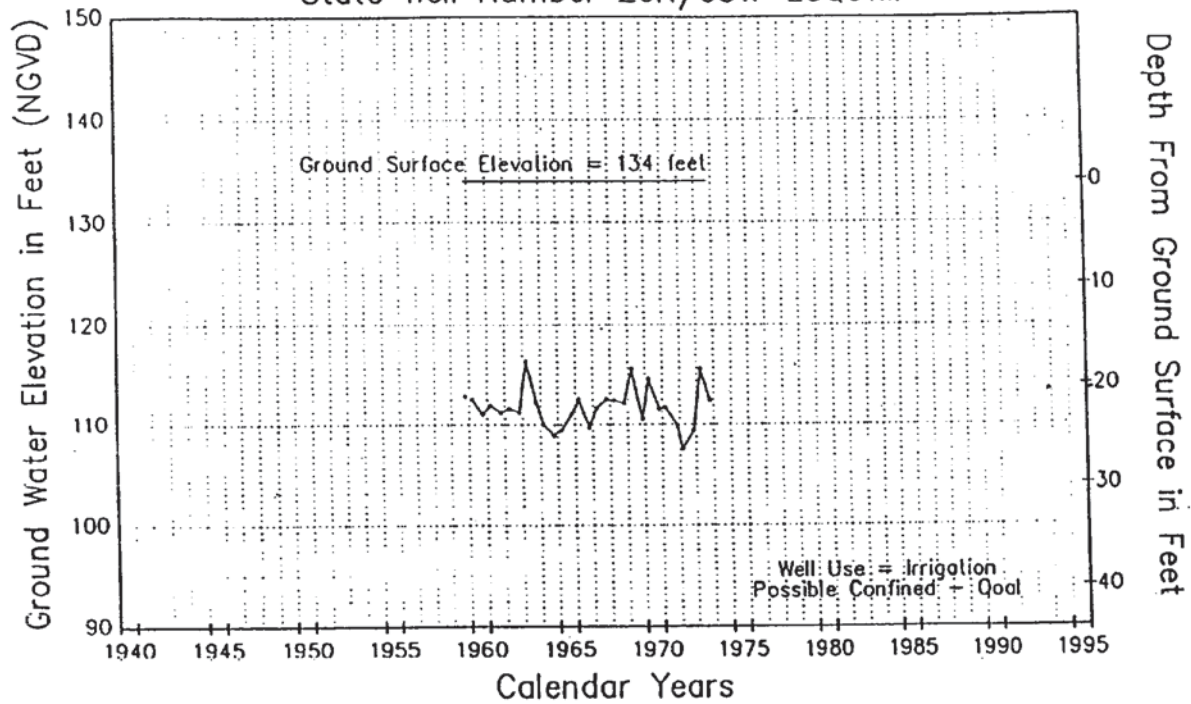
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Department of Water Resources, Northern District



# Sacramento Valley Basin – Glenn County

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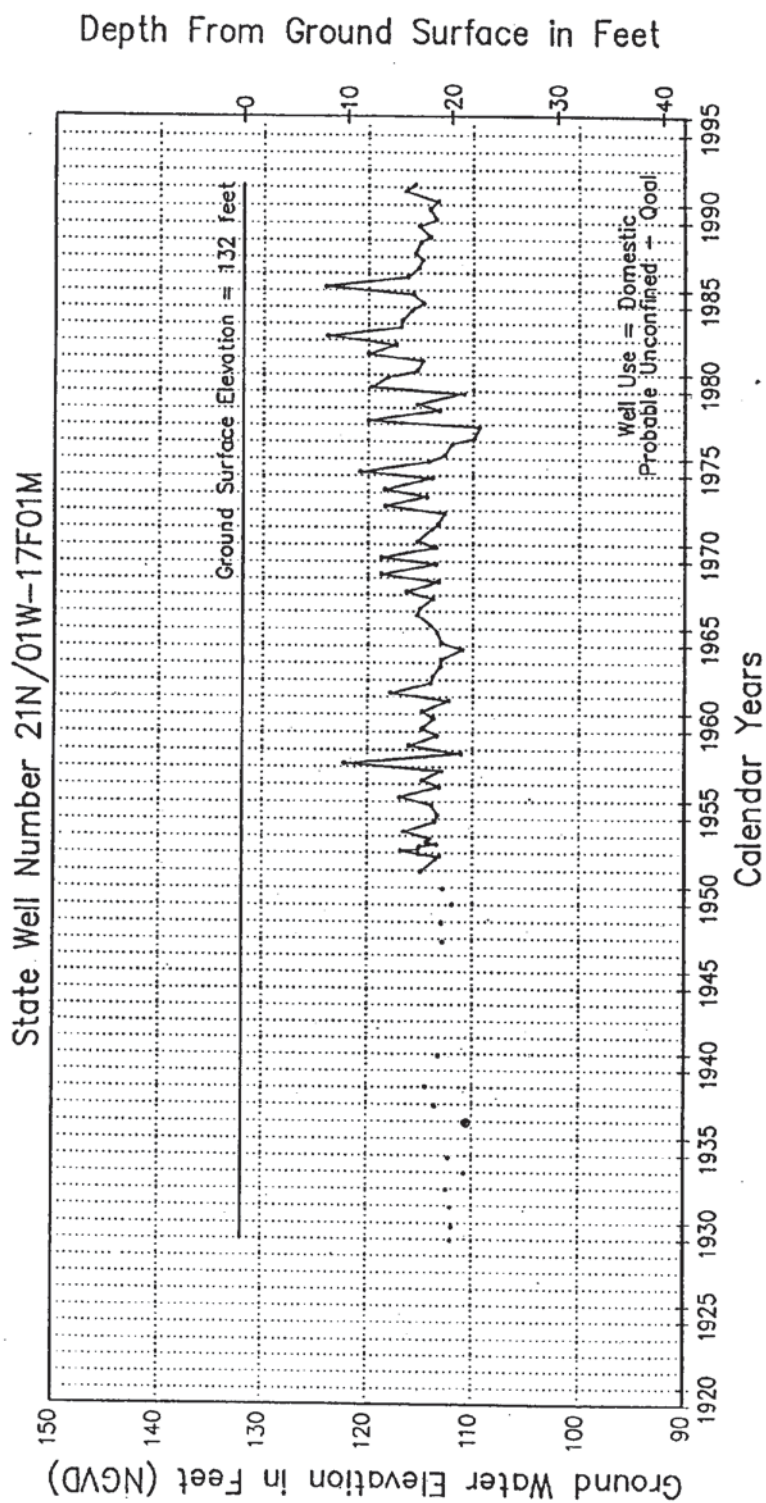


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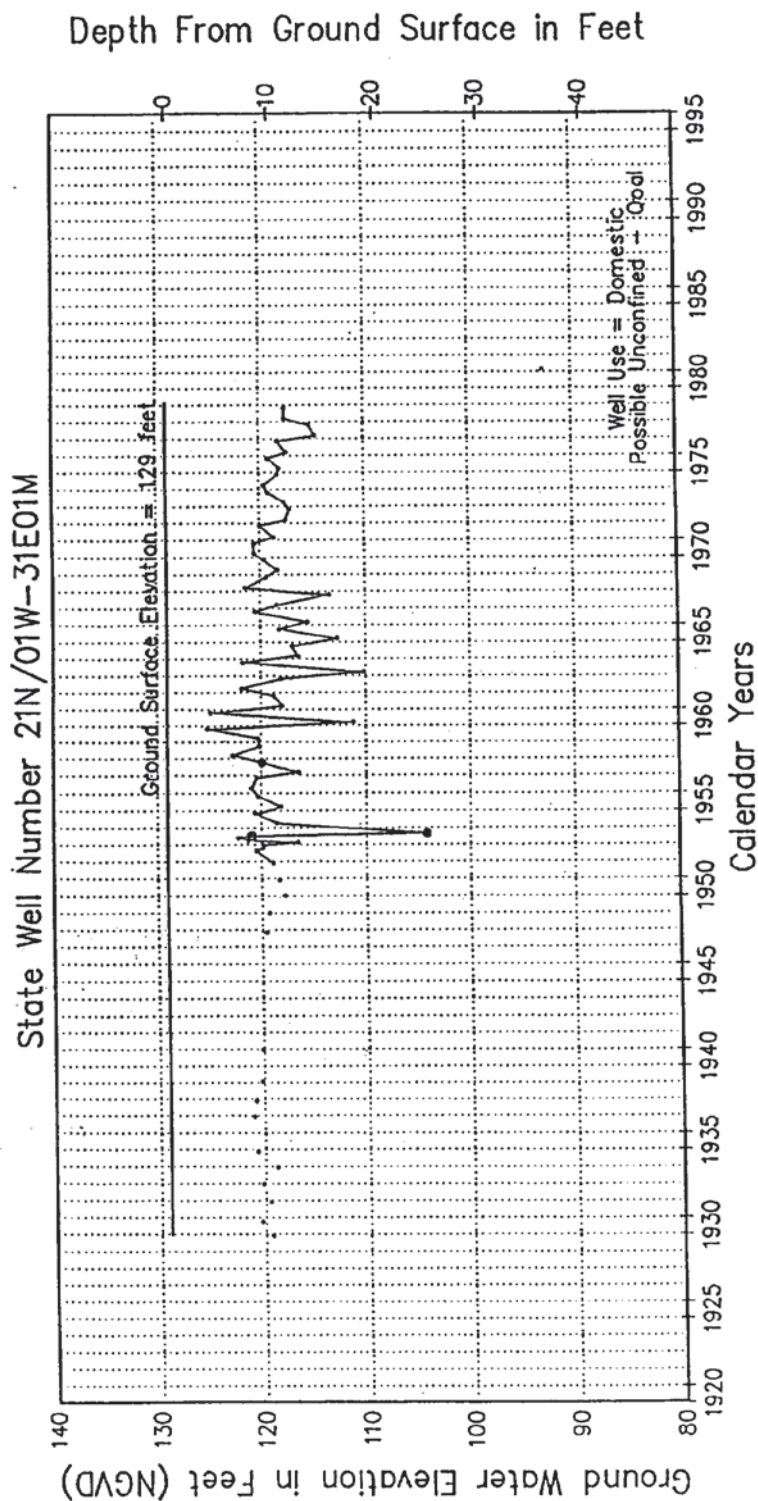
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County



Department of Water Resources, Northern District

# Sacramento Valley Basin - Glenn County

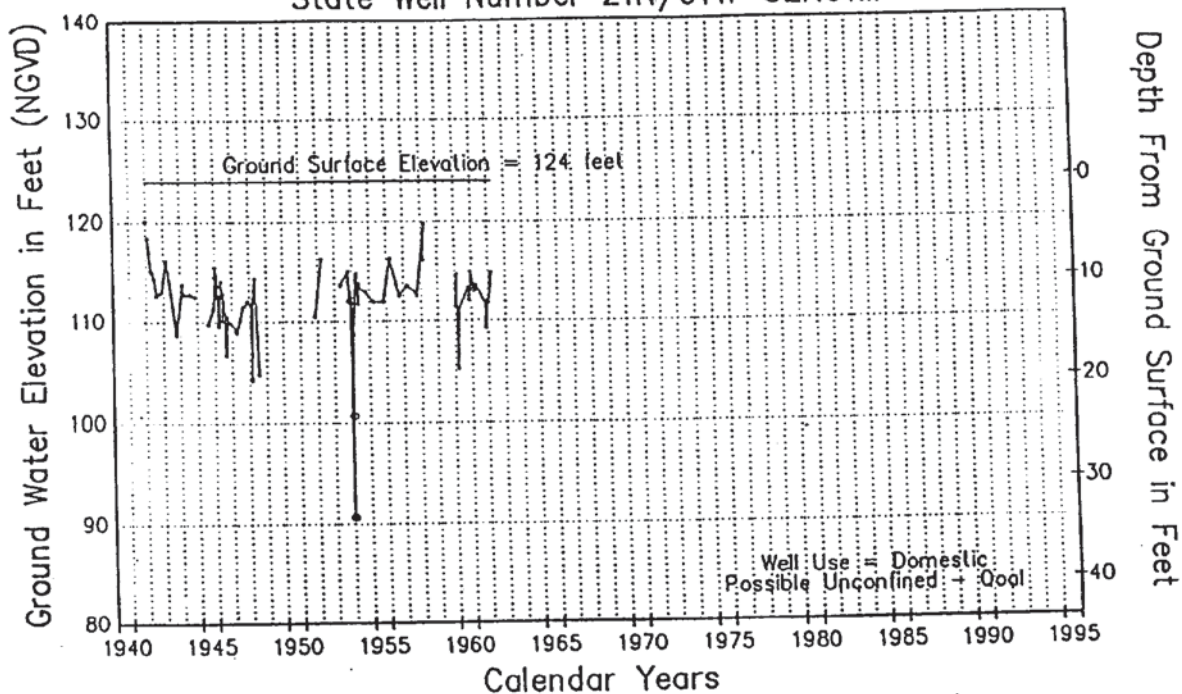


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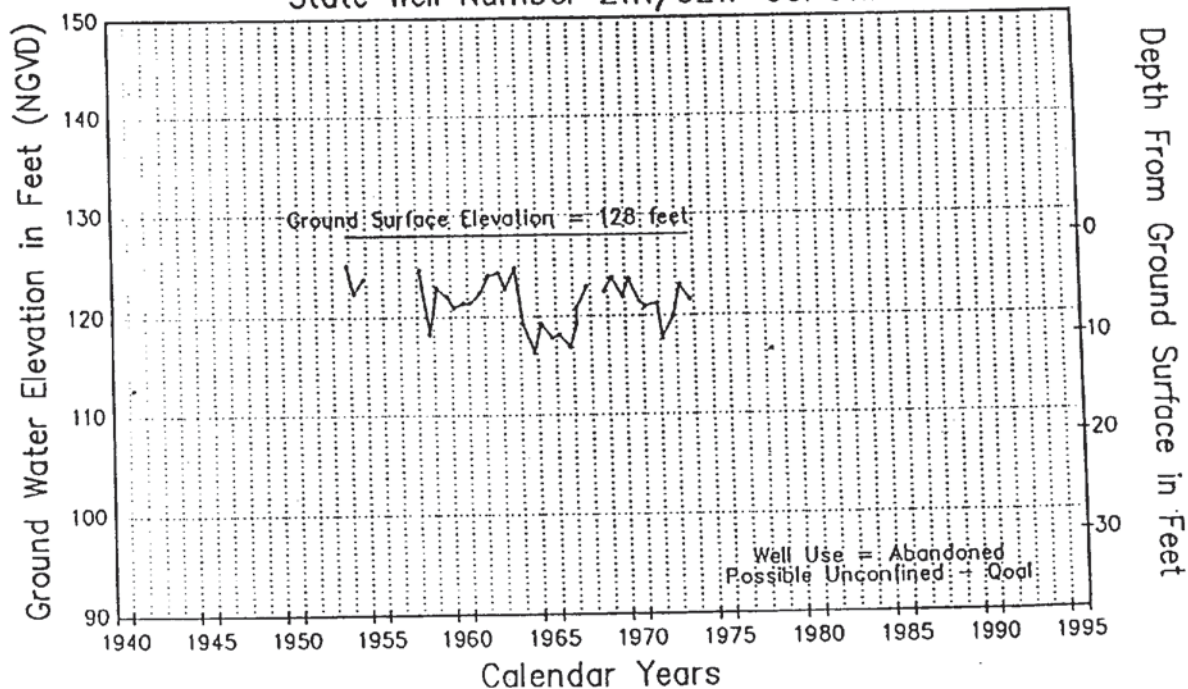
Department of Water Resources, Northern District

# Sacramento Valley Basin – Glenn County

State Well Number 21N/01W-32N01M



State Well Number 21N/02W-35P01M



.....Water surface elevation in well      .....Questionable measurement

Department of Water Resources, Northern District



## **APPENDIX C**

### **California Water Code (applicable Sections)**

**Cross References:**

Precincts and precinct boards: Elec C §§ 1500 et seq.

**§ 60217. Consolidation of district election with state or county election**

If any district election is consolidated with any state or county election, then the voting precincts, polling places, and election officers for the district election shall be the same as those established for such state or county election.

Added Stats 1955 ch 1514 § 1.

**Cross References:**

Consolidation of election precincts: Elec C § 22030.

Consolidation of elections: Elec C §§ 23300 et seq.

**PART 4****POWERS****Chapter**

1. Purposes and Powers. §§ 60220–60223
2. Powers. §§ 60230–60232

**CHAPTER 1***Purposes and Powers*

§ 60220. Necessary acts

§ 60221. District powers for purpose of replenishing ground water supplies

§ 60222. Action necessary to protect or prevent interference with water

§ 60223. Acts necessary to put water to beneficial use

**§ 60220. Necessary acts**

A district may do any act necessary to replenish the ground water of said district.

Added Stats 1955 ch 1514 § 1.

**Cross References:**

"Ground water": § 60015.

**Collateral References:**

Cal Jur 2d Waters §§ 874, 980–986.

Am Jur 2d Irrigation § 62, Municipal Corporations, Counties, and other Political Subdivisions §§ 193 et seq.

**§ 60221. District powers for purpose of replenishing ground water supplies**

Without being limited to the following enumerations, a district may, among other things but only for the purposes of replenishing the ground water supplies within the district:

- (a) Buy and sell water;
- (b) Exchange water;
- (c) Distribute water to persons in exchange for ceasing or reducing ground water extractions;
- (d) Spread, sink and inject water into the underground;
- (e) Store, transport, recapture, reclaim, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the district.
- (f) Build the necessary works to achieve ground water replenishment.

Added Stats 1955 ch 1514 § 1.

**Collateral References:**

Cal Jur 2d Waters § 389.

**§ 60222. Action necessary to protect or prevent interference with water**

A district may take any action necessary to protect or prevent interference with water, the quality thereof, or water rights of persons or property within the district, subject to the limitations contained in Section 60230.

Added Stats 1955 ch 1514 § 1.

**§ 60223. Acts necessary to put water to beneficial use**

For the purposes of replenishing the ground water supplies within the district, a district may do any act in order to put to beneficial use any water under its control or management.

Added Stats 1955 ch 1514 § 1.

**Cross References:**

General state policy as to use of water: §§ 100 et seq.

CHAPTER 2

*Powers*

§ 60230. Powers enumerated

§ 60231. District board to exercise and perform powers and duties: Authority to contract for accomplishment of purposes with existing agency: Purpose of section

§ 60232. General power

**§ 60230. Powers enumerated**

For the purposes of replenishing the ground water supplies within the district, a district shall have power:

- (1) To have perpetual succession.
- (2) To sue and be sued, except as otherwise provided herein or by law, in all actions and proceedings in all courts and tribunals.
- (3) To adopt a seal and alter it at pleasure.
- (4) To take by grant, purchase, gift, devise, or lease, to hold, use and enjoy, and to lease, convey or dispose of, real and personal property of every kind, within or without the district, necessary or convenient to the full exercise of its power.
- (5) Within or outside of the district to construct, purchase, lease, or otherwise acquire, and to operate and maintain necessary waterworks and other works, machinery and facilities, canals, conduits, waters, water rights, spreading grounds, lands, rights and privileges useful or necessary to replenish the underground water basin within said district, or to augment the common water supplies of said district.
- (6) For the common benefit of said district, to store water in underground water basins or reservoirs within or outside of said district, to appropriate and acquire water and water rights within or outside of said district, to import water into said district, and to conserve water within or outside of said district.
- (7) To carry out the purposes of this division, to commence, maintain, intervene in, defend and compromise, in the name of said district, or otherwise, and to assume the costs and expenses of any and all actions and proceedings now or hereafter begun to determine or adjudicate all or a portion of the rights to divert, extract, or use waters within the district, or within any segments thereof or subbasins therein, as between owners of or claimants to said rights, to prevent any interference with water or water rights used or useful to the lands, inhabitants, owners, operators, or producers within said district, or to prevent the diminution of the quantity or quality of the water supply of said district, or to prevent unlawful exportation of water from said district.
- (8) To exercise the right of eminent domain to take any property necessary to supply the district or any portion thereof with replenishment water, except (a) water and water rights already devoted to beneficial use, and (b) property (other than water and water rights) already appropriated to public use unless the taking be for a more necessary public use than that to which the property is already appropriated; provided, the district in exercising such power shall in



addition to the damage for taking, injuring, or destruction of property also pay the cost of removal, reconstruction or relocation of any structure, including, but not limited to, railways, mains, pipes, conduits, wires, cables, towers, or poles of any public utility which is required to be removed to a new location. No use by a district of property owned, at the time the action to condemn is brought, by an existing agency having powers to provide for the replenishment of ground waters, shall constitute a more necessary public use than the use to which the property is already appropriated.

A district shall not exercise the right of eminent domain to acquire property outside the boundaries of the principal county in which the district is situated unless it first obtains the consent thereto of the board of supervisors of the county in which such property is located.

(9) To act jointly with or cooperate with the United States or any agency thereof, and, under the applicable laws of this state, cooperate and act jointly with the State of California, or any county or agency thereof, or any political subdivision or district therein, including flood control districts, public and private corporations, and any person, to the end that the purposes and activities of this district may be fully and economically performed.

(10) To cause assessments and/or charges to be levied as hereinafter provided to accomplish the purposes of this act and to maintain such reserve funds for the future purchase of water for replenishment purposes as are hereinafter authorized to be levied.

(11) To make contracts, to employ labor and to do all acts necessary for the full exercise of the foregoing powers.

(12) To carry on technical and other investigations of all kinds, necessary to carry out the provisions of this act, and for this purpose said district shall have the right of access through its authorized representative to all properties within said district.

(13) To borrow money and incur indebtedness and to issue bonds or other evidences of such indebtedness; also to refund or retire any indebtedness or lien that may exist against the district or property thereof; also to issue warrants to pay the formation expenses of the district, which warrants may bear interest at a rate not exceeding 6 percent a year from the date of issue until funds are available to pay the warrants, and which formation expenses may include fees of attorneys and others employed to conduct the formation proceedings, but shall not include the expenses of holding and conducting the formation election.

(14) To cause taxes to be levied, in the manner hereinafter provided, for the purpose of paying any obligation of the district, including its formation expenses and any warrants issued therefor.

(15) To fix the rates at which water shall be sold for replenishment

purposes, and to establish different rates for different classes of service or conditions of service, provided the rates shall be uniform for like classes and conditions of service.

(16) To fix the terms and conditions of any contract under which producers may agree voluntarily to use replenishment water from a nontributary source in lieu of ground water, and to such end a district may become a party to such contract and pay from district funds such portion of the cost of such replenishment waters as will encourage the purchase and use of such water in lieu of pumping so long as the persons or property within the district are directly or indirectly benefited by the resulting replenishment.

Added Stats 1955 ch 1514 § 1; Amended Stats 1961 ch 585 § 4; Stats 1975 ch 582 § 41, operative July 1, 1976.

**Amendments:**

**1961 Amendment:** (1) Substituted subd (7) for former subd (7) which read, "(7) To carry out the purposes of this act, to commence, maintain, intervene in, defend and compromise, in the name of said district, or otherwise, and to assume the costs and expenses of any and all actions and proceedings now or hereafter begun to prevent interference with water or water rights used or useful to lands within said district, or diminution of the quantity or pollution or contamination of the water supply of said district, or to prevent unlawful exportation of water from said district, or to prevent any interference with the water or water rights used or useful in said district which may endanger or damage the inhabitants, lands or use of water in said district; provided, however, that said district shall not have the power to intervene or take part in, or to pay costs or expenses of actions or controversies between the owners of lands or water rights all of which are entirely within the boundaries of said district, unless the same in an action to adjudicate all or substantially all of the rights to use or extract ground water within said district, but none other"; (2) added the second paragraph of subd (8); and (3) added "and to maintain such reserve funds for the future purchase of water for replenishment purposes as hereinafter authorized to be levied" at the end of subd (10).

**1975 Amendment:** (1) Substituted "division" for "act" after "purposes of this" in subd (7); (2) amended the first paragraph of subd (8) by deleting (a) "have and" after "To"; (b) "and in the manner provided by law for the condemnation of private property for public use," after "eminent domain" in the first sentence; and (c) the third sentence which read: "In proceedings relative to the exercise of such right, the district shall have all of the rights, powers and privileges of a city."; and (3) substituted "to acquire" for "under this subdivision for the condemnation of" in the second paragraph of subd (8).

**Note**—The 1975 amendment to this section became operative on the operative date of Stats 1975 ch 1275, such date being July 1, 1976, under terms of Stats 1976 ch 22, as amended by Stats 1976 ch 393.

**Law Revision Commission Comment:**

Section 60230 is amended to delete unnecessary language. see Code Civ. Proc. § 1230.020 (uniform procedure).

See also Recommendation and Study by California Law Revision Commission, dated January 1963, relating to sovereign immunity.

**Cross References:**

General state policy as to use of water: §§ 100 et seq.

Effect of division on legal proceeding pending on May 1, 1955: § 60051.

District's authority to protect or prevent interference with water as subject to limitations contained in this section: § 60222.

Water charge: §§ 60245, 60246.

Taxes in water replenishment district: §§ 60250 et seq.

Bonds of water replenishment districts: §§ 60270 et seq.

Water replenishment assessment: §§ 60300 et seq.

Eminent domain generally: CCP §§ 1230.010 et seq; Const Art I § 19; Ev C §§ 810 et seq; Gov C §§ 15850 et seq.

Requirement that water resources of state be put to beneficial use: Const Art X § 2.

Constitutional limitation on incurring indebtedness: Const Art XVI § 1.

**Collateral References:**

29 Cal Jur 3d Eminent Domain § 10; Cal Jur 2d Waters §§ 980-986.

Am Jur 2d Irrigation § 62, Municipal Corporations, Counties, and other Political subdivisions §§ 193 et seq.

**Law Review Articles:**

Ground water basin management. 50 CLR 56.

**§ 60231. District board to exercise and perform powers and duties:  
Authority to contract for accomplishment of purposes with existing  
agency: Purpose of section**

The powers and duties herein enumerated shall, except as herein otherwise expressly provided, be exercised and performed by the board of the district. In the event an existing agency has facilities available and adequate to accomplish any part of the purposes of a district created under this act, the district shall investigate and determine the cost of contracting for the accomplishment of such purpose through such existing agency. Thereupon, the board shall make a finding as to whether or not the purpose proposed to be accomplished by the district can be achieved more economically and for the best interests of the area to be benefited by entering into such a contract with an existing agency. If the board finds that such contract is more economical and for the best interests of the area to be benefited, it shall so contract for the accomplishment of said purpose, if such agency so agrees. The purpose of this section is to avoid duplication of similar operations by existing agencies and replenishment districts.

Added Stats 1955 ch 1514 § 1.

**§ 60232. General power**

Each district has the power generally to perform all acts necessary to carry out fully the provisions of this act.

Added Stats 1955 ch 1514 § 1.

**PART 5**

**FINANCES**

**Chapter**

**1. Depositary. § 60240**



2. Water Charge. §§ 60245, 60246
3. Taxes. §§ 60250-60257
4. Bonds. §§ 60270-60282

## CHAPTER 1

*Depository***§ 60240. Method of depositing, investing and withdrawing funds**

Any money belonging to a district may be deposited or invested and drawn out as provided in Title 5, Division 2, Part 1, Chapter 4, Article 2 of the Government Code, as now or hereafter amended.

Added Stats 1955 ch 1514 § 1.

**Cross References:**

Designation of depositories having custody of district funds: § 60155.  
Deposit of funds of local agencies: Gov C §§ 53630 et seq.

## CHAPTER 2

*Water Charge*

§ 60245. Rate

§ 60246. Uniformity

**§ 60245. Rate**

The board shall fix such rate or rates for the sale or exchange of water for replenishment purposes only as will result in revenues which will pay, insofar as practicable, the operating expenses of the district.

Added Stats 1955 ch 1514 § 1.

**Cross References:**

Levy of tax where revenues resulting from charges authorized by this section are inadequate: § 60250.

**Collateral References:**

Cal Jur 2d Waters § 1005.  
45 Am Jur 2d Irrigation § 63.

**§ 60246. Uniformity**

The rate charged shall be uniform for like classes and conditions of service.

Added Stats 1955 ch 1514 § 1.



**§ 60143. Compensation of directors**

Each director shall receive compensation in an amount not exceeding one hundred dollars (\$100) for each day's attendance at meetings of the board or for each day's service rendered as a director by request of the board, not exceeding a total of six days in any calendar month, together with any expenses incurred in the performance of his duties required or authorized by the board.

Amended Stats 1981 ch 725 § 6.

**Amendments:**

**1981 Amendment:** Substituted "one hundred dollars (\$100)" for "fifty dollars (\$50)".

**CHAPTER 2***Board of Directors***§ 60152. [Section repealed]**

Repealed by Stats 1985 ch 536 § 2. The repealed section related to opening legislative sessions of board to public.

**§ 60156. [Section repealed]**

Repealed by Stats 1985 ch 536 § 3. The repealed section related to certificate to be filed by districts formed prior to January 1, 1964.

**CHAPTER 1***Purposes and Powers***Collateral References:**

Cal Jur 3d Water § 854.

**§ 60224. Actions taken within district**

For the purpose of protecting and preserving the groundwater supplies within the district for beneficial uses, a district may take any action, within the district, including, but not limited to, capital expenditures and legal actions, which in the discretion of the board is necessary or desirable to accomplish any of the following:

- (a) Prevent contaminants from entering the groundwater supplies of the district, whether or not the threat is immediate.
- (b) Remove contaminants from the groundwater supplies of the district.
- (c) Determine the existence, extent, and location of contaminants in, or which may enter, the groundwater supplies of the district.
- (d) Determine persons, whether natural persons or public entities, responsible for those contaminants.
- (e) Perform or obtain engineering, hydrologic, and scientific studies for any of the foregoing purposes.

Added Stats 1990 ch 389 § 3 (SB 2016).

**§ 60225. Actions taken outside district**

A district may take any action outside the district, including, but not limited to, those set forth in Section 60224, provided the board finds both of the following:

(a) The action is reasonably necessary to protect groundwater supplies within the district.

(b) There is a direct, material relationship between the groundwater supply where the action is to be taken and the groundwater supply within the district.

Added Stats 1990 ch 389 § 4 (SB 2016).

#### § 60226. Proceeding for recovery of expenditures by district

A district may sue and recover the amount of any district expenditures under Section 60224 from the person or persons responsible for the contaminants causing the expenditures. In proceeding under any state or federal law, a district may recover those expenses from responsible persons and governmental insurance funds. In any action the district, if successful, may recover reasonable attorney's fees and court costs, as determined by the court. The right or power to recover damages shall not be deemed an adequate remedy at law precluding use of injunctive relief under this section or any other provision of this division or any other statute. In any action for injunctive relief relating to contaminants, no bond shall be required of a district as a condition to granting a preliminary injunction.

Added Stats 1990 ch 389 § 4.5 (SB 2016).

## CHAPTER 2

### *Powers*

#### § 60230. Powers of district

For the purposes of replenishing the groundwater supplies within the district, a district shall have power:

(a) To have perpetual succession.

(b) To sue and be sued, except as otherwise provided in this division or by law, in all actions and proceedings in all courts and tribunals.

(c) To adopt a seal and alter it at pleasure.

(d) To take by grant, purchase, gift, devise, or lease, to hold, use and enjoy, and to lease, convey or dispose of, real and personal property of every kind, within or without the district, necessary or convenient to the full exercise of its power.

(e) Within or outside of the district to construct, purchase, lease, or otherwise acquire, and to operate and maintain necessary waterworks and other works, machinery and facilities, canals, conduits, waters, water rights, spreading grounds, lands, rights and privileges useful or necessary to replenish the underground water basin within the district, or to augment the common water supplies of the district, including, but not limited to, the exercise of any power under Section 60224.

(f) For the common benefit of the district, to store water in underground water basins or reservoirs within or outside of the district, to appropriate and acquire water and water rights within or outside of the district, to import water into the district, and to conserve water within or outside of the district.

(g) To carry out the purposes of this division, to commence, maintain, intervene in, defend and compromise, in the name of the district, or otherwise, and to assume the costs and expenses of any and all actions and proceedings

now or hereafter begun to determine or adjudicate all or a portion of the rights to divert, extract, or use waters within the district, or within any segments thereof or subbasins therein, as between owners of or claimants to those rights, to prevent any interference with water or water rights used or useful to the lands, inhabitants, owners, operators, or producers within the district, or to prevent the diminution of the quantity or quality of the water supply of the district, or to prevent unlawful exportation of water from the district.

(h) To exercise the right of eminent domain to take any property necessary to supply the district or any portion thereof with replenishment water, including, but not limited to, the exercise of any power under Section 60224, except that the right of eminent domain may not be exercised with respect to (1) water and water rights already devoted to beneficial use, and (2) property (other than water and water rights) already appropriated to public use unless the taking be for a more necessary public use than that to which the property is already appropriated; provided that the district in exercising that power shall in addition to the damage for taking, injuring, or destruction of property also pay the cost of removal, reconstruction, or relocation of any structure, including, but not limited to, railways, mains, pipes, conduits, wires, cables, towers, or poles of any public utility which is required to be removed to a new location. No use by a district of property owned, at the time the action to condemn is brought, by an existing agency having powers to provide for the replenishment of groundwater, shall constitute a more necessary public use than the use to which the property is already appropriated.

A district shall not exercise the right of eminent domain to acquire property outside the boundaries of the principal county in which the district is situated unless it first obtains the consent thereto of the board of supervisors of the county in which the property is located.

(i) To act jointly with or cooperate with the United States or any agency thereof, and cooperate and act jointly with the state, or any county or agency thereof, or any political subdivision or district therein, including flood control districts, public and private corporations, and any person, to the end that the purposes and activities of the district may be fully and economically performed.

(j) To cause assessments and charges to be levied as provided in this division to accomplish the purposes of this division and to maintain such reserve funds for the future purchase of water for replenishment purposes as may be authorized to be levied.

(k) To make contracts, employ labor, and do all acts necessary for the full exercise of the foregoing powers.

(l) To carry on technical and other investigations of all kinds, necessary to carry out the provisions of this division, and for this purpose the district shall have the right of access through its authorized representative to all properties within the district.

(m) To borrow money and incur indebtedness and to issue bonds or other evidences of that indebtedness; to refund or retire any indebtedness or lien that may exist against the district or property thereof; to issue warrants to pay the formation expenses of the district, which may bear interest at a rate not exceeding 6 percent a year from the date of issue until funds are available to pay the warrants, and which formation expenses may include fees of attorneys and others employed to conduct the formation proceedings, but shall not include the expenses of holding and conducting the formation election.



(n) To cause taxes to be levied, in the manner provided in this division, for the purpose of paying any obligation of the district, including its formation expenses and any warrants issued therefor.

(o) To fix the rates at which water shall be sold for replenishment purposes, and to establish different rates for different classes of service or conditions of service, provided the rates shall be uniform for like classes and conditions of service.

(p) To fix the terms and conditions of any contract under which producers may agree voluntarily to use replenishment water from a nontributary source in lieu of groundwater, and to that end a district may become a party to the contract and pay from district funds that portion of the cost of the replenishment waters as will encourage the purchase and use of that water in lieu of pumping so long as the persons or property within the district are directly or indirectly benefited by the resulting replenishment.

Amended Stats 1990 ch 389 § 5 (SB 2016).

**Amendments:**

1990 Amendment: In addition to making technical changes, (1) redesignated former subds (1)-(16) to be subds (a)-(p); (2) added ", including, but not limited to, the exercise of any power under Section 60224" at the end of subd (e); (3) substituted "including but not limited to, the exercise of any power under Section 60224, except that the right of eminent domain may not be exercised with respect to (1)" for "except (a)" in the first paragraph of subd (h); (4) substituted "cooperate and act jointly with the state" for ", under the applicable laws of this state, cooperate and act jointly with the State of California" in subd (i); (5) substituted subd (j) for the former subdivision; and (6) substituted "division" for "act" after "provisions of this" in subd (l).

## CHAPTER 4

### *Bonds*

#### **§ 60280. Time for commencing validation proceedings**

**Collateral References:**

How long is six months (for statute of limitations purposes) in California? Enquiring minds want to know! 19 Southwestern U LR 205.

## CHAPTER 1

### *Survey*

#### **§ 60301. Contents of engineering survey and report**

If the district has received an engineering evaluation as to any matter within the powers of the district under Section 60224 and containing proposed action or alternate actions and estimated costs, including engineering and legal fees and expenses and district overhead, the board may, not later than the second Tuesday in February of each year, order the inclusion in the engineering survey and report referred to in Section 60300 of a statement of the proposed action or alternate actions and those estimated costs.

Added Stats 1990 ch 389 § 6 (SB 2016).

## CHAPTER 2

### *Hearings*

#### **§ 60305. Determination by resolution of method of raising water replenishment funds**

On or before the second Tuesday in March of each year, and provided the survey and report called for by Section 60300 has been made, the board, by



resolution, shall declare whether funds shall be raised to purchase water for replenishment during the next ensuing fiscal year and whether the funds shall be raised either by (a) a water charge, as provided in Chapter 2 (commencing with Section 60245) of Part 5, (b) a general assessment, as provided in Chapter 3 (commencing with Section 60250) of Part 5, (c) a replenishment assessment as provided in this chapter, or (d) a combination of any two or more of the foregoing, and whether the funds so to be raised, whether by a water charge, a general assessment, a replenishment assessment or a combination of those means, will benefit, directly or indirectly, all of the persons or real property and improvements within the district. The resolution shall also declare whether funds shall be raised to remove contaminants from groundwater supplies during the next ensuing fiscal year or to exercise any other power under Section 60224, and whether funds for that purpose shall be raised by a replenishment assessment as provided in this chapter, with a like statement of benefit.

Amended Stats 1990 ch 389 § 7 (SB 2016).

**Amendments:**

**1990 Amendment:** In addition to making technical changes, added (1) "(commencing with Section 60245)" and "(commencing with Section 60250)" in the first sentence; and (2) the second sentence.

**§ 60306. Notice of hearing to determine extent of replenishment assessment; Contents**

If the board, by resolution, determines that all or a portion of the funds needed to purchase replenishment water, or to remove contaminants from the groundwater supplies of the district, or to exercise any other power under Section 60224, shall be raised by the levy of a replenishment assessment, then the board shall immediately publish a notice that a public hearing will be held on the second Tuesday of April for the purpose of determining whether and to what extent the estimated costs thereof for the ensuing year shall be paid for by a replenishment assessment. The notice shall contain a copy of the board's resolution, the time and place of the hearing, and an invitation to all interested parties to attend and be heard in support of or opposition to the proposed assessment, the engineering survey and report, and the board's determination, and shall invite inspection of the engineering survey and report upon which the board acted. The notice shall be published in each affected county pursuant to Section 6061 of the Government Code, at least 10 days before the hearing date.

Amended Stats 1990 ch 389 § 8 (SB 2016).

**Amendments:**

**1990 Amendment:** In addition to making technical changes, amended the first sentence by (1) adding ", or to remove contaminants from the groundwater supplies of the district, or to exercise any other power under Section 60224,"; and (2) substituting "costs thereof" for "cost of purchasing water for replenishment".

**CHAPTER 3**

*Findings and Order*

**§ 60315. When resolution to be made; Contents**

Upon completing the hearing, but no later than the second Tuesday in May, the board shall, by resolution, find the following:

- (a) The annual overdraft for the preceding water year.
- (b) The estimated annual overdraft for the current water year.

- (c) The estimated annual overdraft for the ensuing water year.
- (d) The accumulated overdraft as of the last day of the preceding water year.
- (e) The estimated accumulated overdraft as of the last day of the current water year.
- (f) The total production of groundwater from the groundwater supplies within the district during the preceding water year.
- (g) The estimated total production of groundwater from the groundwater supplies within the district for the current water year.
- (h) The estimated total production of groundwater from the groundwater supplies within the district for the ensuing water year.
- (i) The changes during the preceding water year in the pressure levels or piezometric heights of the groundwater contained within pressure-level areas of the district, and the effects thereof upon the groundwater supplies within the district.
- (j) The estimated changes during the current water year in the pressure levels or piezometric heights of the groundwater contained within pressure-level areas of the district, and the estimated effects thereof upon the groundwater supplies within the district.
- (k) The quantity of water which should be purchased for the replenishment of the groundwater supplies of the district during the ensuing water year.
- (l) The source and estimated cost of water available for the replenishment.
- (m) The estimated costs of replenishing the groundwater supplies with the water so purchased.
- (n) The estimated costs of purchasing, in water years succeeding the ensuing water year, that portion of the quantity of water which should be purchased for the replenishment of the groundwater supplies of the district during the ensuing water year, but which is estimated to be unavailable for purchase during the ensuing water year; estimated costs shall be based on the estimated price of water for replenishment purposes during the ensuing water year.
- (o) The estimated rate of the replenishment assessment required to be levied upon the production of groundwater from the groundwater supplies within the district during the ensuing fiscal year for the purposes of accomplishing the replenishment and providing a reserve fund to purchase in future years, when available, that portion of the quantity of water which should be purchased for the replenishment of the groundwater supplies of the district during the ensuing water year, but which is estimated to be unavailable for purchase during that ensuing water year.
- (p) Whether any contaminants should be removed from groundwater supplies during the ensuing fiscal year, and whether any other actions under Section 60224 should be undertaken during the ensuing fiscal year, the estimated costs thereof, and the estimated additional rate of replenishment assessment required to be levied upon the production of groundwater from the groundwater supplies within the district during the ensuing fiscal year for those purposes.
- (q) Whether any program for removal of contaminants or other actions under Section 60224 should be a multiyear program or is a continuation of a previously authorized multiyear program.

Amended Stats 1990 ch 389 § 9 (SB 2016).

**Amendments:**

**1990 Amendment:** In addition to making technical changes, (1) redesignated former subds (1)-(15) to be subds (a)-(o); (2) added "the following" in the introductory clause; (3) deleted "replenishment" before "district" wherever it appears in subds (f)-(k), (n), and (o); and (4) added subds (p) and (q).



**§ 60316. Determination of portion of cost to be paid for by assessment**

Based on the findings pursuant to Section 60315, the board shall, by resolution, determine all of the following:

- (a) What portion, if any, of the estimated cost of purchasing water for replenishment for the ensuing fiscal year shall be paid for by a replenishment assessment.
- (b) What portion, not exceeding 25 percent of the above portion, of the estimated cost of purchasing in the future that quantity of water which should be purchased during the ensuing water year, but which is estimated to be unavailable during that year, shall be raised by a replenishment assessment.
- (c) What portion of the estimated costs of removing contaminants from groundwater supplies and of taking other actions under Section 60224 during the ensuing fiscal year shall be paid for by a replenishment assessment.

Amended Stats 1990 ch 389 § 10 (SB 2016).

**Amendments:**

**1990 Amendment:** (1) Amended the introductory clause by (a) substituting "the findings pursuant to Section 60315," for "such findings"; and (b) adding "all of the following: (a)"; (2) substituted ". (b)" for ", and" at the end of subd (a); (3) amended subd (b) by substituting (a) "above" for "aforesaid" after "percent of the"; and (b) "shall" for "should" after "that year,"; and (4) added subd (c).

**§ 60317. Replenishment assessment; When to be levied; Rate**

If the board determines that a replenishment assessment shall be levied upon the production of groundwater from groundwater supplies within the district during the ensuing fiscal year, immediately following the making of that determination the board shall levy a replenishment assessment on the production of groundwater from the groundwater supplies within the district during the fiscal year commencing on July 1st next, and the replenishment assessment shall be fixed by the board at a uniform rate per acre-foot of groundwater so produced. The producers of that groundwater shall pay the replenishment assessment to the district at the times and in the manner provided in this division. That part of the assessment levied pursuant to the determination provided in subdivision (c) of Section 60316, exclusive of any part thereof for district administrative and overhead expenses, shall not exceed 50 percent of the average assessment levied for the current and four preceding fiscal years pursuant to determinations under subdivisions (a) and (b) of Section 60316, exclusive of any part thereof for district administrative and overhead expenses.

Amended Stats 1990 ch 389 § 11 (SB 2016).

**Amendments:**

**1990 Amendment:** In addition to making technical changes, (1) deleted "replenishment" before "district during" both times it appears in the first sentence and before "district at the" in the second sentence; (2) substituted "provided in this division" for "hereinafter in this act provided" in the second sentence; and (3) added the third sentence.

**§ 60317.5. Use of district funds; Use of funds from replenishment assessments**

Except as set forth in this section, nothing in this division prevents the use of district funds from any source for powers and functions authorized under this division. That part of a replenishment assessment levied pursuant to determinations under subdivisions (a) and (b) of Section 60316 shall not be utilized for the direct costs of prevention and removal of contaminants under subdivisions (a) and (b) of Section 60224. Any part of a replenishment assessment levied pursuant to a determination under subdivision (c) of Section 60316 which is not expended may be obligated and expended for other uses

authorized by Section 60224 after hearing and findings pursuant to Sections 60306 and 60315. Any part of a replenishment assessment levied pursuant to a determination under subdivision (c) of Section 60316 which remains unexpended and unobligated for five fiscal years after the last obligation thereof, or any shorter period which the board may by resolution determine, shall be deemed to have been levied for other costs and expenses for which a replenishment assessment is authorized under this division. Funds from a replenishment assessment, although restricted as to use, may be loaned for any use for which and within the monetary limits for which, such an assessment has been levied. Any such loan shall be for a period not longer than 18 months and shall bear interest, as nearly as practicable in the discretion of the board, at the rate which those funds might have otherwise been invested at the time of the loan.

Added Stats 1990 ch 389 § 12 (SB 2016).

#### § 60318. Exemption for extractors of contaminated groundwater

If the board determines by resolution that there is a problem of groundwater contamination that a proposed program will remedy or ameliorate, an operator may make extractions of groundwater to remedy or ameliorate that problem exempt from any replenishment assessment if the water is not applied to beneficial surface use, its extractions are made in compliance with all the terms and conditions of the board resolution, and the board has determined in the resolution either of the following:

- (a) The groundwater to be extracted is unusable and cannot be economically blended for use with other water.
- (b) The proposed program involves extraction of usable water in the same quantity as will be returned to the underground without degradation of quality.

The resolution may provide those terms and conditions the board deems appropriate, including, but not limited to, restrictions on the quantity of extractions to be so exempted, limitations on time, periodic reviews, requirement of submission of test results from a board-approved laboratory, and any other relevant terms or conditions. Upon written notice to the operator involved, the board may rescind or modify its resolution. The rescission or modification of the resolution shall apply to groundwater extractions occurring more than 10 days after the rescission or modification. Notice of rescission or modification shall be either mailed first-class mail, postage prepaid, at least two weeks prior to the meeting of the board at which the rescission or modification will be made to the address of record of the operator or personally delivered two weeks prior to the meeting. All board determinations shall be final.

Added Stats 1985 ch 537 § 1.

#### § 60326.1. Sworn statement by operators of facilities in Water Replenishment District of Southern California

Notwithstanding Section 60326, the operator of each water-producing facility in the Water Replenishment District of Southern California shall file with the district, by the last day of the month following the statement period, a sworn statement declaring all of the following:

- (a) The facility's total groundwater production, measured in acre-feet, during the month preceding the filing of the statement.



- (b) A general description or number locating the facility.
- (c) The method used to compute the groundwater production.
- (d) Other information that the district may require.

Added Stats 1993 ch 52 § 1 (AB 2235).

#### **§ 60327.1. Payment of replenishment assessment by producers to Water Replenishment District of Southern California**

Notwithstanding Section 60327, each producer shall pay the Water Replenishment District of Southern California a replenishment assessment, imposed pursuant to this act, in monthly installments due on the last day for filing the groundwater production statement required by Section 60326.1. The assessment amount shall be computed by multiplying the facility's stated groundwater production, measured in acre-feet, by the replenishment assessment rate imposed by the district board for the fiscal year in which the production occurs.

Added Stats 1993 ch 52 § 2 (AB 2235).

#### **§ 60329. Small installments**

The board, by action uniformly applicable as to any quarter, and adopted prior to the commencement of the quarter, may provide that there shall not be due or payable any quarterly installment of less than three dollars (\$3) otherwise payable by a producer under Section 60327 with respect to production of groundwater from all water-producing facilities operated by the producer during the quarterly period.

Added Stats 1985 ch 536 § 4.

### **CHAPTER 5**

#### *Penalties and Exemptions*

#### **§ 60339. Issuance of restraining order or injunction; Service of process**

(a) The superior court of the county in which the major portion of the district lies may issue a temporary restraining order upon the filing by the district with the court of a verified petition or complaint setting forth that the person named therein as defendant is the operator of a water-producing facility which has not been registered with the district or that the defendant is delinquent in the payment of a replenishment assessment. The temporary restraining order shall be returnable to the court on or before ten (10) days after its issuance.

(b) The court may issue and grant an injunction restraining and prohibiting the named defendant from the operation of any water-producing facility when it is established by the preponderance of the evidence at a hearing that the defendant has failed to register the water-producing facility with the district or that the defendant is delinquent in the payment of a replenishment assessment. The court may provide that the injunction so made and issued shall be stayed for a period not to exceed 10 days to permit the defendant to register the water-producing facility or to pay the delinquent replenishment assessment.

(c) Service of process shall be made by posting a copy of the summons and complaint upon the water-producing facility or the parcel of land upon which the water-producing facility is located and by personal service of summons and complaint upon the named defendant.

(d) The right to proceed for injunctive relief as provided in this section shall be in addition to any other right which may be provided elsewhere in this act or which may be otherwise allowed by law. The procedure provided in Chapter 3 (commencing with Section 525) of Title 7 of Part 2 of the Code of Civil Procedure regarding injunctions shall be followed except insofar as it may be otherwise provided in this section.

Amended Stats 1982 ch 517 § 408.

**Amendments:**

**1982 Amendment:** In addition to adding subdivision designations and making technical changes, substituted "in this section shall be in addition to any other right which may be provided elsewhere in this act or which may be otherwise allowed by law. The procedure provided in Chapter 3 (commencing with Section 525) of Title 7 of Part 2 of the Code of Civil Procedure regarding injunctions shall be followed except insofar as it may be otherwise provided in this section" for "herein shall be in addition to any other right which may be provided elsewhere in this act or which may be otherwise allowed by law. The procedure provided in Part 2, Title 7, Chapter 3 of the Code of Civil Procedure regarding injunctions shall be followed except insofar as it may be otherwise provided herein. The replenishment district shall not be required to furnish an undertaking or bond as a condition to the granting of injunctive relief" after "relief as provided" in subd (d).

**Law Revision Commission Comment:**

Section 60339 is amended to delete a provision duplicated in the Bond and Undertaking Law. See Code Civ. Proc. § 995.220 (undertaking not required of public entity). The other changes in Section 60339 are technical.

**Collateral References:**

Review of Selected 1982 Legislation. 14 Pacific LJ 468.

**§ 60342. When water measuring device to be required; Extension; Publication of notice; Application of section; Penalty**

It shall be unlawful to produce groundwater from any water-producing facility within any district from and after one year following the adoption of the resolution provided for in Section 60305 hereof, unless such water-producing facility shall have a water-measuring device affixed thereto capable of registering the accumulated amount of groundwater produced therefrom.

The board by resolution may extend such date on a year-to-year basis upon its determination that availability, price of water-measuring devices, or other circumstances justify such extension. Should the date be extended, notice thereof shall be published in the district pursuant to Section 6066 of the Government Code, such publication to be completed not less than two months prior to the date so extended.

This section shall not be applicable to any operator of a water-producing facility having a discharge opening two inches or less in diameter and providing groundwater for domestic or irrigation uses on an area not exceeding one acre in extent, who is required to pay a replenishment assessment in an amount fixed by resolution of the board of the district as hereinabove in this act provided.

Violation of this section shall be punishable by a fine not to exceed one thousand dollars (\$1,000), or by imprisonment in the county jail for not to exceed six months, or by both such fine and imprisonment. Each day of operation of a water-producing facility in violation hereof shall constitute a separate offense.

Amended Stats 1983 ch 1092 § 416, effective September 27, 1983, operative January 1, 1984.

**Amendments:**

**1983 Amendment:** Doubled the fine in the last paragraph.

**Collateral References:**

Review of Selected 1983 Legislation. 15 Pacific LJ 560.

**§ 60343. Suspension of date for fixing water-measuring device; Procedure**

If another public entity, or public entities, or a watermaster, or watermasters, appointed in one or more court adjudications, or any combination of the foregoing (hereafter "other regulator or regulators") is monitoring by appropriate means the water production of substantially all water producers within the district, the board may, by resolution, indefinitely suspend the date for affixing a water-measuring device as referenced in Section 60342.

The suspension does not affect any requirements of any other regulator or regulators. The suspension may be revoked, and the date for affixing water measuring devices established, by further board resolution.

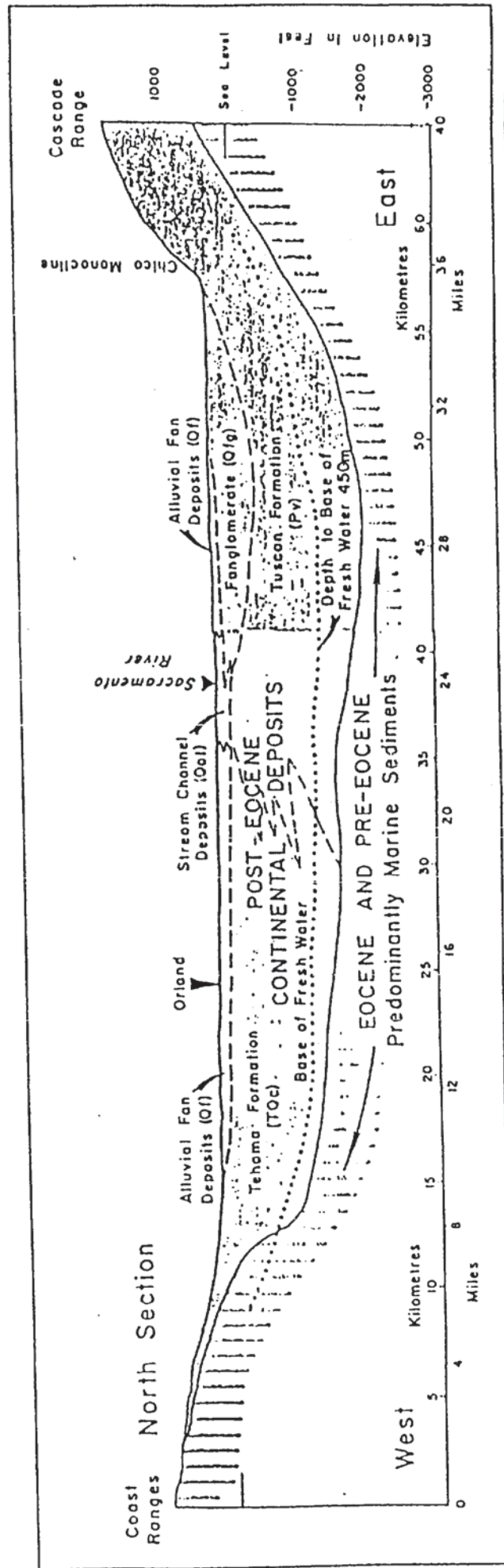
All resolutions adopted under this section shall be published in the district pursuant to Section 6006 of the Government Code. In the case of any revocation, the publication shall be completed not less than two months prior to the operative date of the revocation. In the case of any revocation, notice of the operative date shall be given by first-class mail, postage prepaid, to operators at any address of record within the district within the time required for publication, but no defect in or failure to mail the notice to any operator affects the operative date of the revocation.

Added Stats 1985 ch 536 § 5.

# **APPENDIX D**

## **Geologic Cross Section of the Sacramento Valley**





**THE BASE OF FRESH WATER IN THE SACRAMENTO VALLEY.** This map depicts a cross section of the Sacramento Valley floor, approximately between Orland and Chico. The definition of saline water corresponds to a TDS of about 2,000 mg/l. As shown, the base of fresh water in the north valley occurs from -400 to -1,200 feet below sea level in a large area. In some areas the depth to salt water is about -2,400 feet. DWR Bulletin 118-6 reports that "Saline water occurs at a shallow depth west of the Sutter Buttes near Colusa and also in south Sutter County. The source is believed to be marine sediments surrounding Sutter Buttes. Saline water apparently has been flushed from the uplifted Cretaceous sediments. In south Sutter County, Saline water is believed to be rising along a permeable zone associated with a fault." Map Source: DWR Bulletin 118-6